Gas Journal

VOL. 275. 105TH YEAR. LONDON, SEPTEMBER 23, 1953. NO. 4712. PRICE 1/3

It's a Thoroughbred

DOUBLE

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CENTURY

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PARKINSON & COWAN GAS METERS

(A division of Parkinson and Cowan Limited)

TERMINAL HOUSE, GROSVENOR GARDENS, LONDON, S.W.I

SISSON STEAM ENGINES

DESIGNED
for
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EXHAUSTERS
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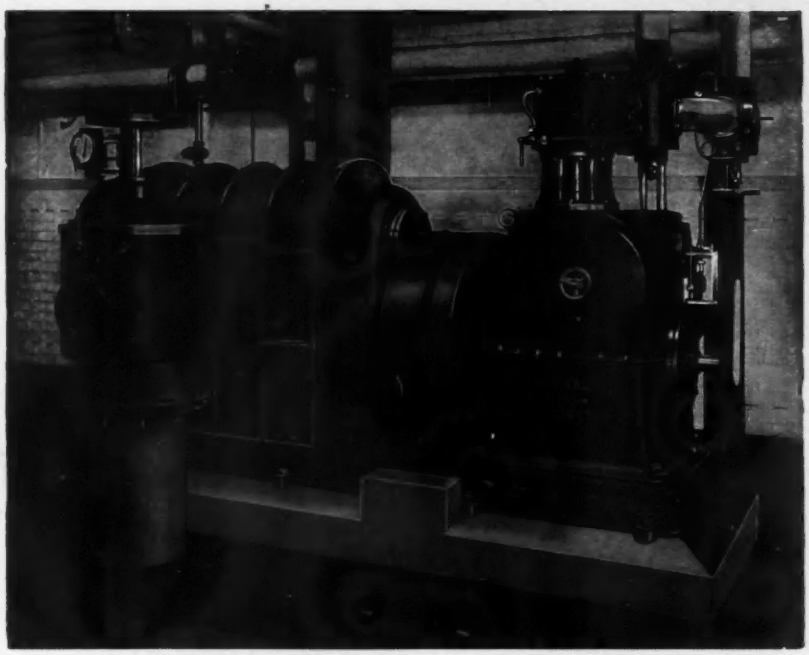

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"HICKS" TYPE WITH INTERNAL SCREW

UP TO 24" - 10 lbs. per sq. in.
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THIS VALVE has the following special advantages:—

Access to all working parts for cleaning while valve is under pressure.
The valve is of the parallel slide type and cannot jam.
The faces are cleaned each time the valve is opened or closed.
The faces and spindles can be lubricated whilst in position, through points provided.
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Vertical or horizontal type.
These valves can also be supplied with external screw if required.

BRITISH VALVE MANUFACTURERS ASSOCIATION

The **BRYAN DONKIN CO LTD** · Chesterfield

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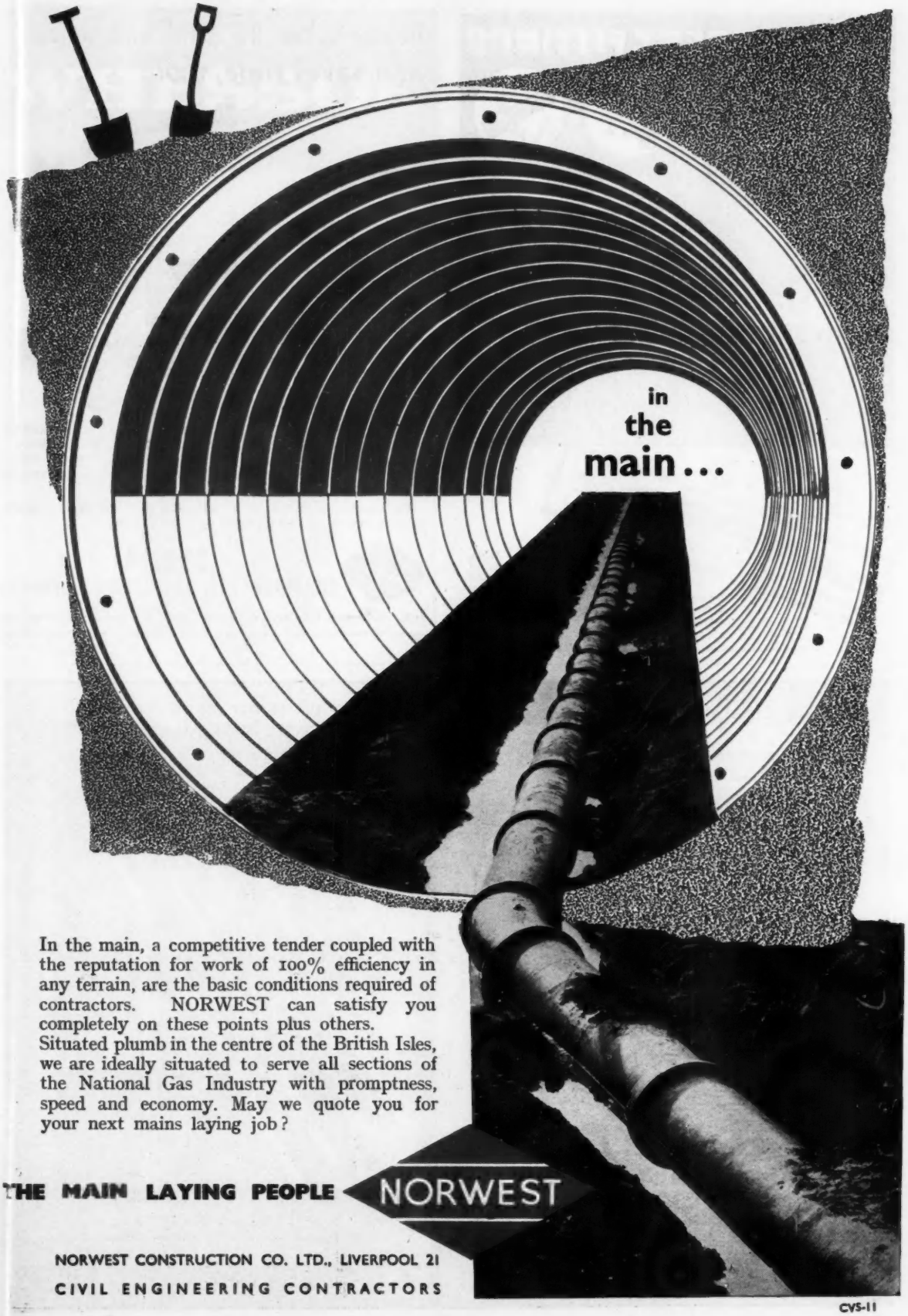

In the main, a competitive tender coupled with the reputation for work of 100% efficiency in any terrain, are the basic conditions required of contractors. NORWEST can satisfy you completely on these points plus others.
Situated plumb in the centre of the British Isles, we are ideally situated to serve all sections of the National Gas Industry with promptness, speed and economy. May we quote you for your next mains laying job?

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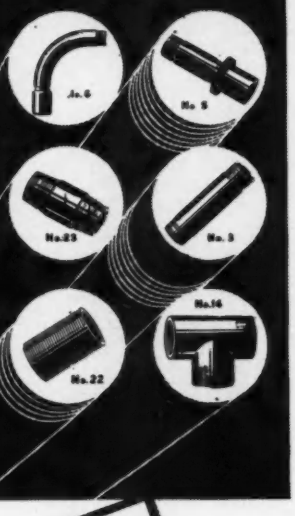
STEEL TUBES & FITTINGS

FOR

Gas, Water & Steam



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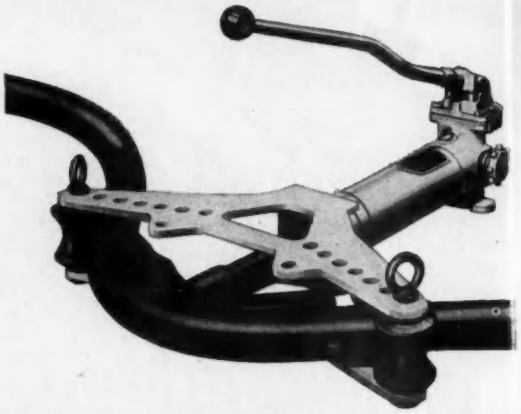
RUSSELL BROS (WALSALL) LIMITED

BRADFORD TUBE WORKS · WALSALL · ENGLAND

The Bradford Tube Works occupies a factory area of some three acres exclusively devoted to the manufacture of Steel Tubes and Fittings.
Contractors to Admiralty and War Office.
Extensive stocks.

bends tubes 90° cold and unloaded
and saves time, too!



This Two-Stage Bender is mainly for use on steam and gas tubes of ¾" to 2" nominal bore, but with special accessories it will also bend other sizes and types of tubing. Working time is saved by the patent two-stage principle and the accurately machined forming dies ensure wrinkle-free bends.

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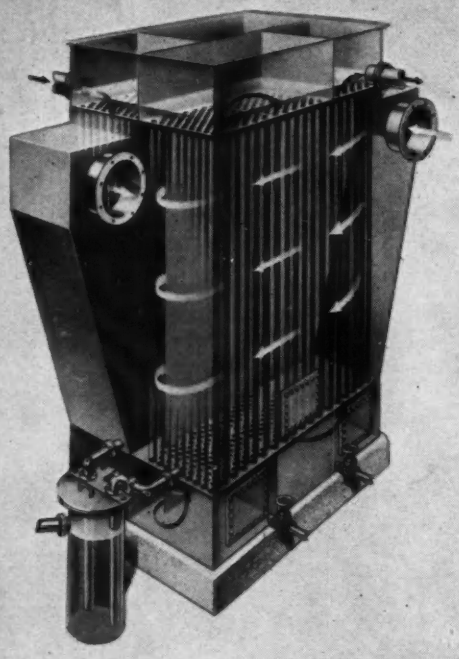
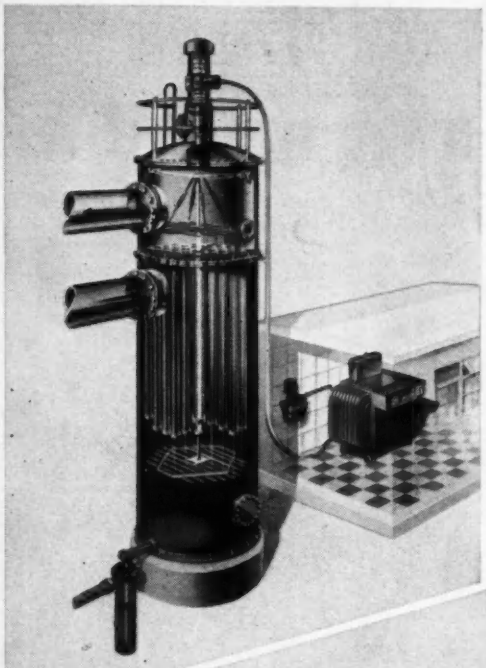
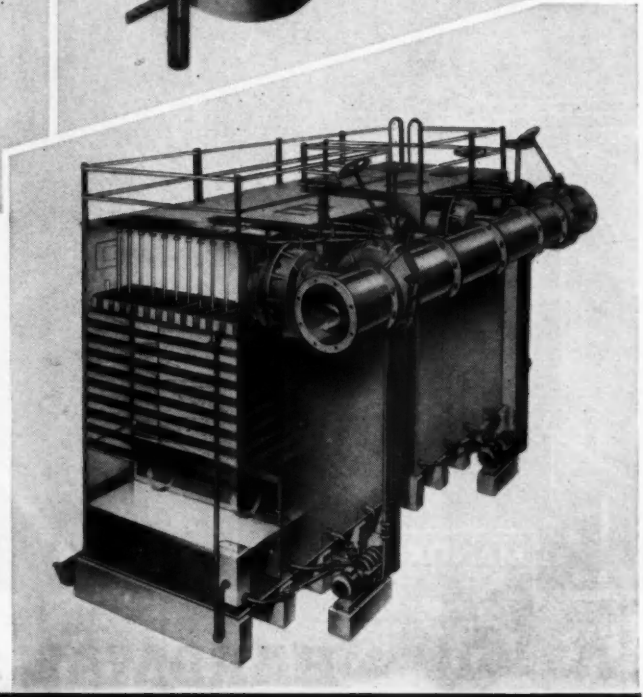
TREATMENT PLANT FOR THE GAS INDUSTRY







Whessoe design and build COMPLETE ANCILLARY PLANT for the treatment of all fuel gases. Many of these complete purification plants embody CONDENSERS, W.W-D. ELECTRO-DETARRERS and STATIC SCRUBBERS, the features of which are illustrated on this page.

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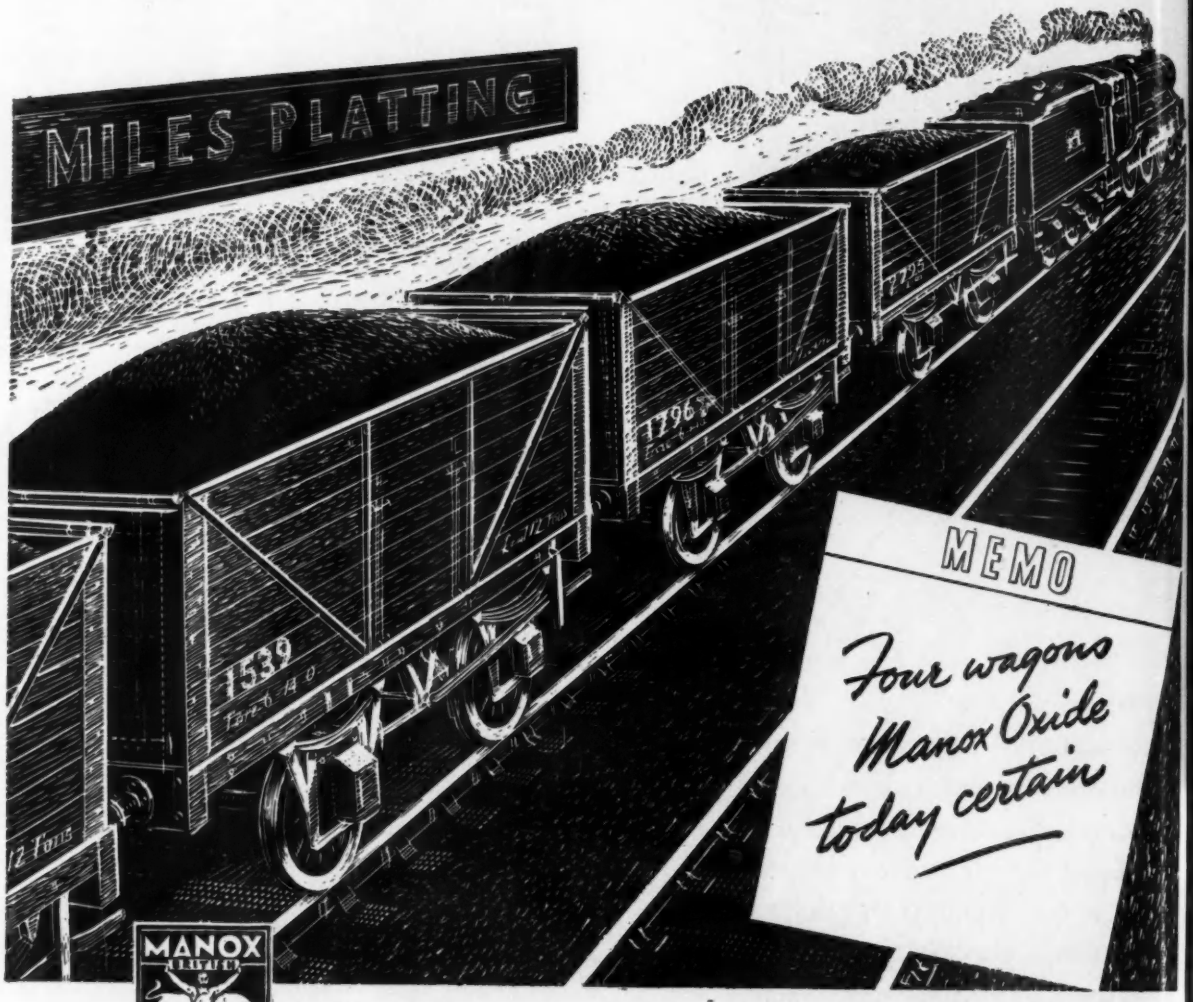
FOR THE GAS INDUSTRY



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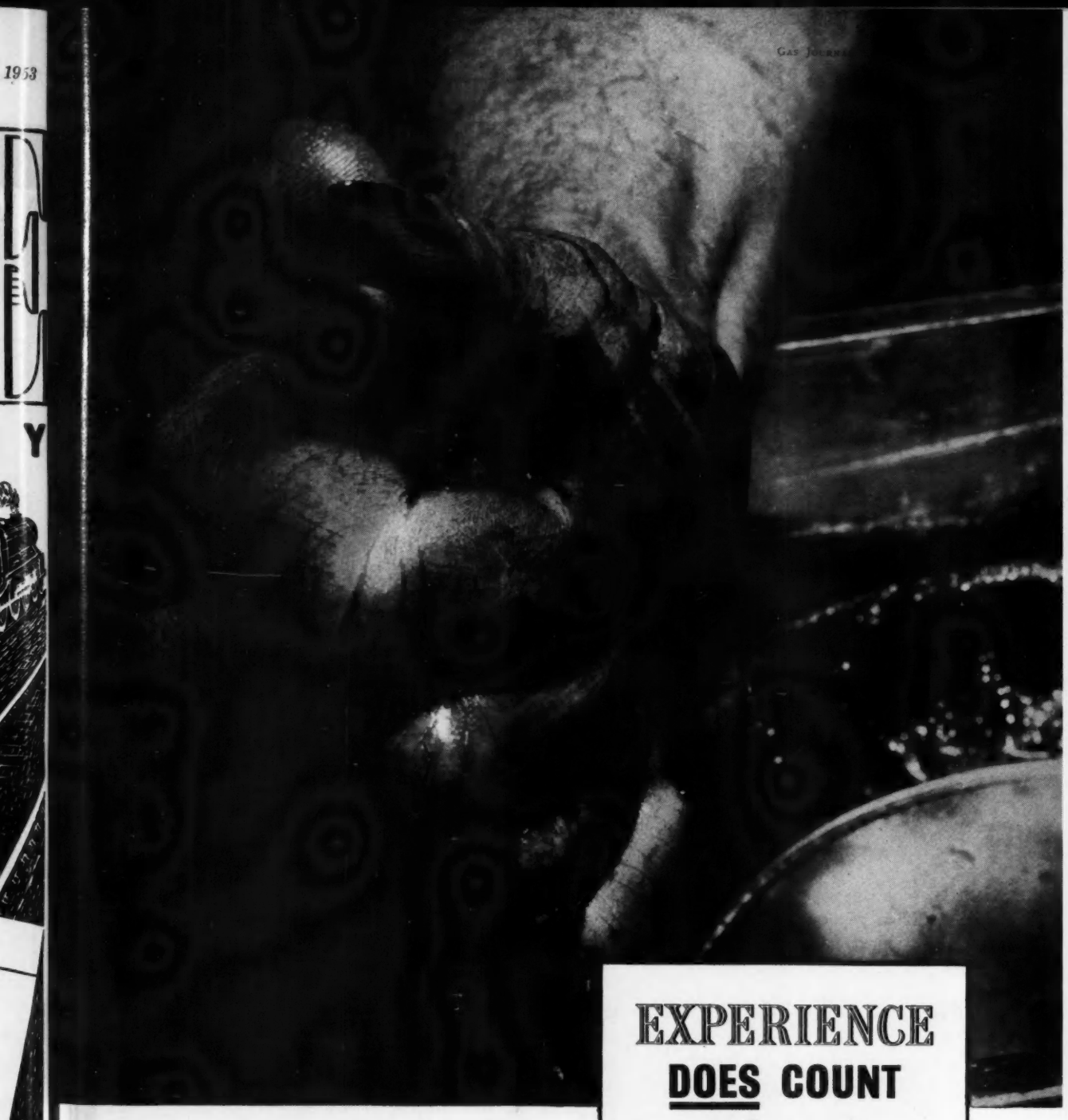
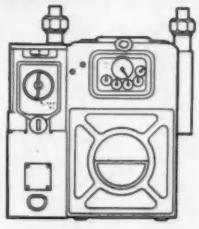


WILLEY

EXPERIENCE
DOES COUNT



In the production of meters, as in that of all Willey equipment, precision is the keynote. From the selection of materials to the final testing, high standards are set for man and machine alike.

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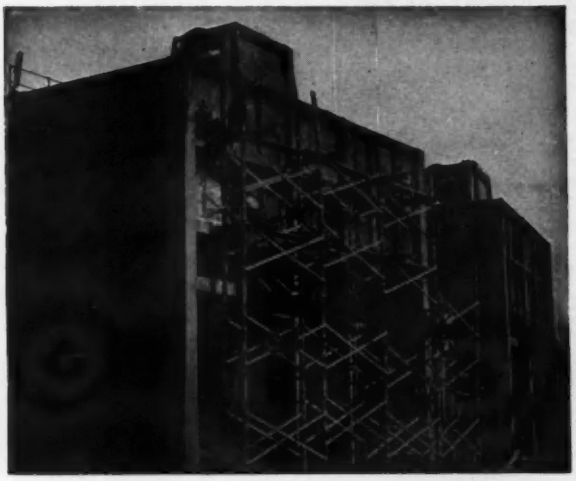
Gunite



One of the reinforced concrete structures reconditioned with Gunite for the City of Carlisle Gas Undertaking.

Gunite—concrete applied by air pressure—has numerous applications where its great density and extreme adhesion have exceptional value.

For repairing reinforced concrete it has particular merit, as, due to the method of application, a uniform density and adherence is obtained whenever Gunite is applied.

For lining coal bunkers and steel chimneys it possesses great resistance to corrosion and protects steel-work from the abrasive action of coal or coke.

Handbook "GUNITE" sent on request

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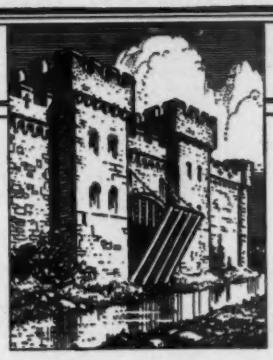

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GAUNTLET

GAUNTLET

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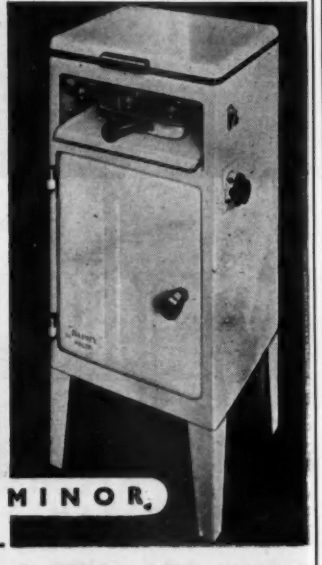
27-37 BARDOWIE STREET POSSILPARK GLASGOW N

BIG Capacity for LITTLE Kitchens



Especially suited to the kitchens of flats and small houses, this highly efficient cooker provides utmost cooking capacity in the least possible space. Cast iron construction ensures strength and durability and reduces maintenance costs to a minimum, thus making the Dainty Minor particularly suitable for simple hire or hire purchase.

Approved and adopted by leading gas boards

The **Dainty** MINOR

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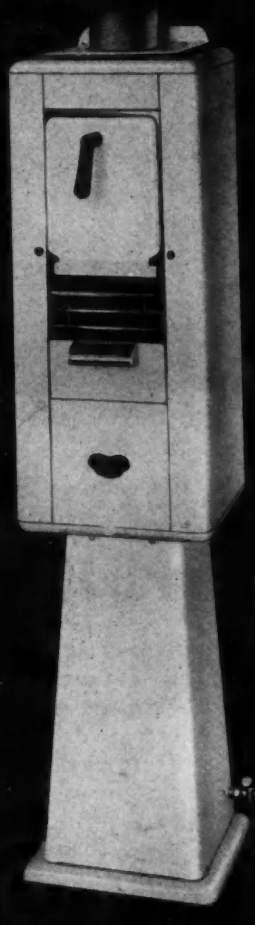

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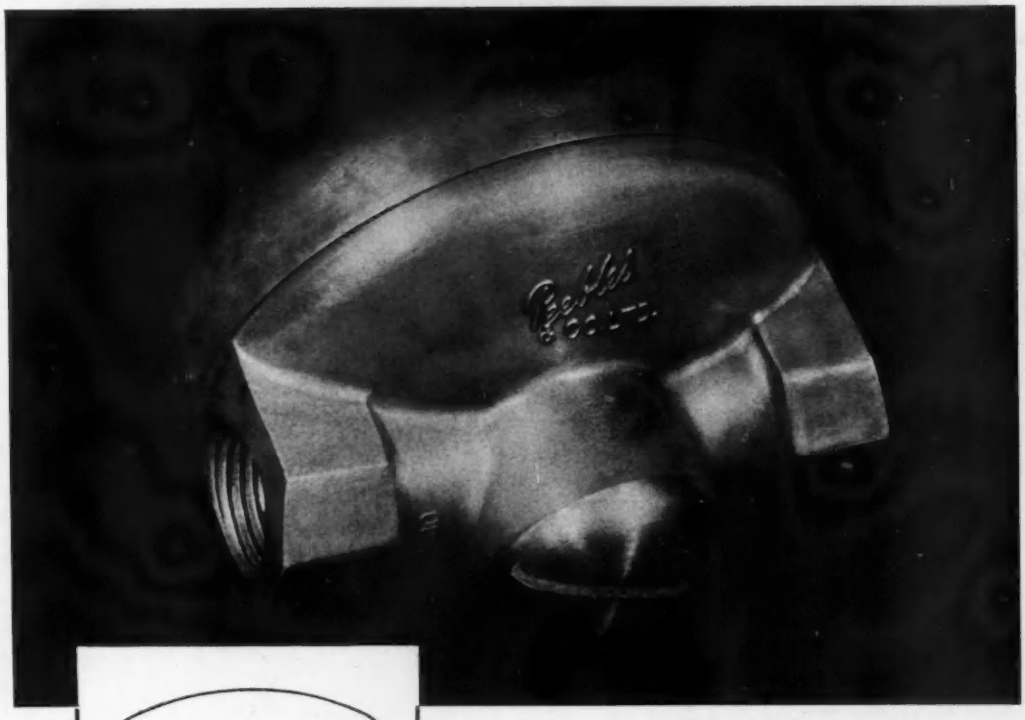

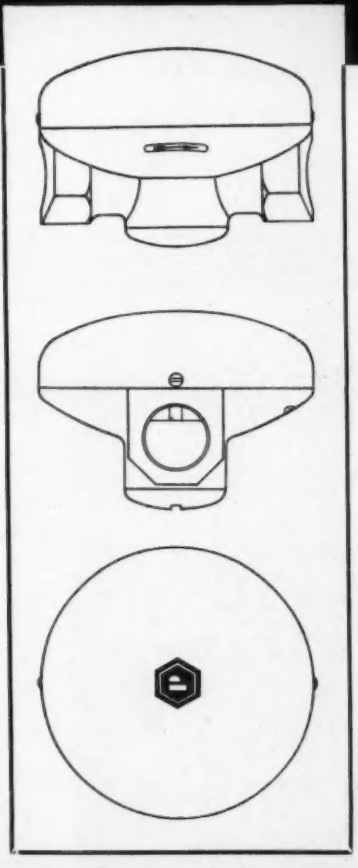

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The "Fig. 100" Appliance Governor is exceptional, not only in smooth exterior appearance, but also in its internal design, and its performance. Pressure die cast for close grained metal, designed and precision-made for stable performance and minimum maintenance costs, **it gives excellent response to every demand made upon it.**

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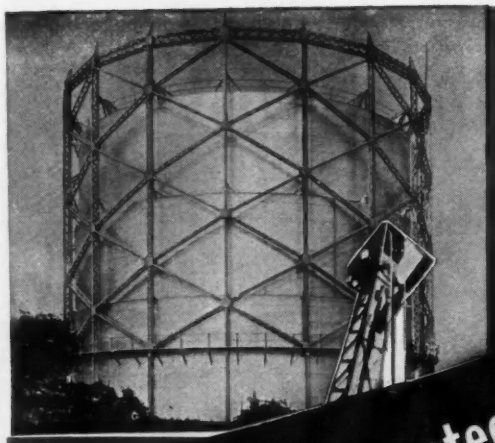

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For the protection of metal structures

Spirit Containers, property of Sacor Petroleum Co. in Portugal, coated with "Atlas Ruskilla" Aluminium Paint. High reflectivity of this paint reduces effects of solar heat and consequent loss of spirit by evaporation.

ATLAS RUSKILLA Iron and Steel Preservative Paints have been specifically designed for the enduring protection of all types of structural work. They embody over half-a-century of specialised experience in the manufacture of anti-corrosive paints, and their stamina has been proved in every part of the world. Let us send you Shade Card and prices.

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TAS/AS 76

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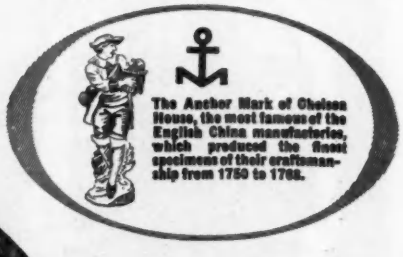
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As with china, the hall-mark of a distinctive boiler is represented by the nameplate. But there the comparison ends, because "Paxmans" have been making fine boilers for nearly a hundred years. Designed to meet individual requirements they give trouble-free operation under any load conditions.

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2 MANUFACTURED THROUGHOUT IN AN AIR-CONDITIONED FACTORY

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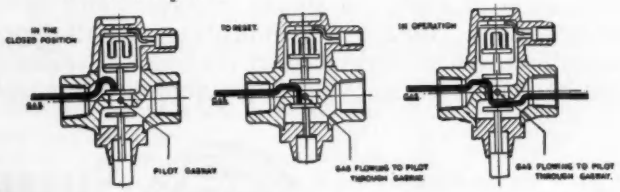
MONITROL AUTOMATIC *Shut off* VALVE

Manufactured by Monitor Engineering & Oil Appliances Ltd., in co-operation with the Robertshaw-Fulton Controls Company, U.S.A.

THE MONITROL heralds a great technical advance in **British Made** Automatic Shut-Off Valves. The design and methods of manufacture are based on the many years of specialised American experience which has made the name Robertshaw-Fulton synonimous with the highest efficiency and production techniques.



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Every Gas Engineer should make sure of having a copy for reference. Fully illustrated, and informative, it describes Construction of Pilot Burner, Thermocouple and Valve, Method of Operation, Installation and General Specification.

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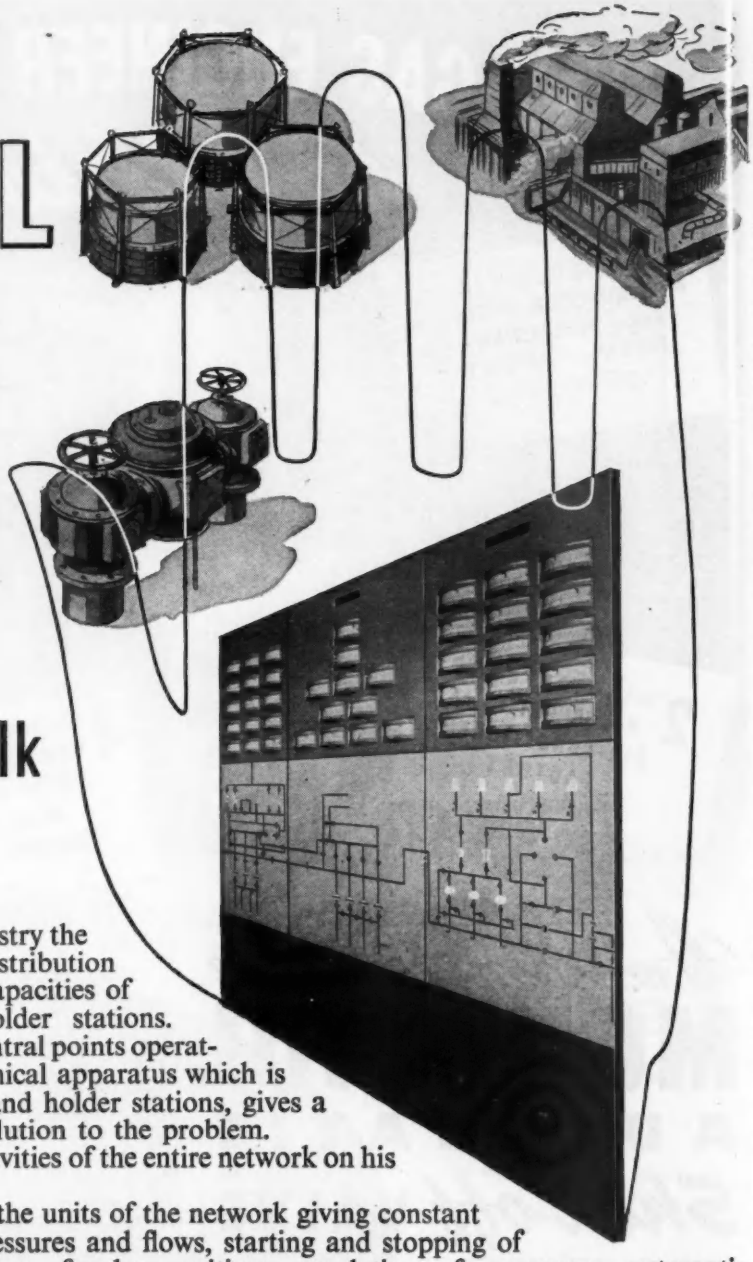
A Member of the Parkinson & Cowan Group.

REMOTE CONTROL of DISTRICT STATIONS gives efficient regulation of bulk gas distribution



With the integration of the gas industry the need arises for unified systems of distribution irrespective of the locations and capacities of the manufacturing units and holder stations. Centralised remote control from central points operating in conjunction with the mechanical apparatus which is now available for manufacturing and holder stations, gives a highly efficient and economical solution to the problem. The control engineer "sees" the activities of the entire network on his diagram.

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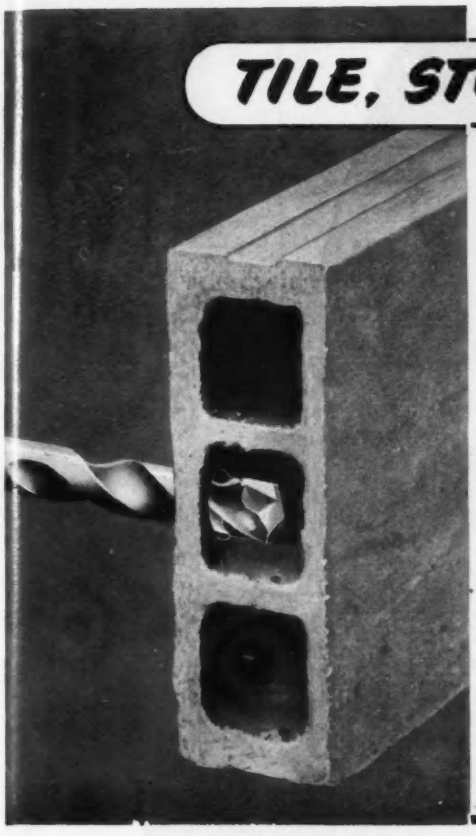

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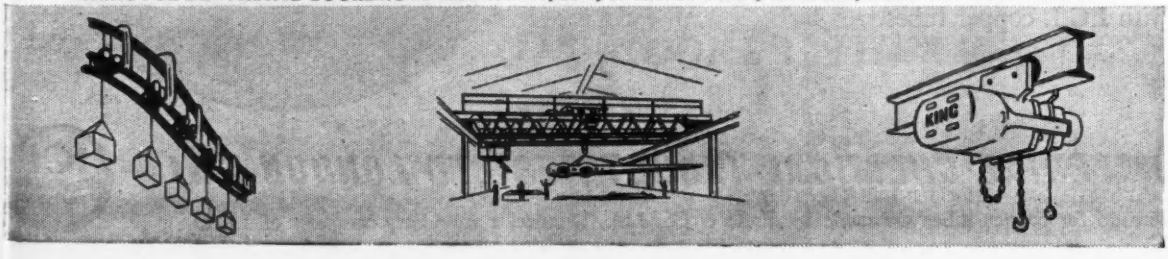

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For domestic gas systems, light gauge copper tubes made by the Metals Division of I.C.I. have five obvious advantages. They are:—

1 **Economical, both in laying costs and maintenance.**

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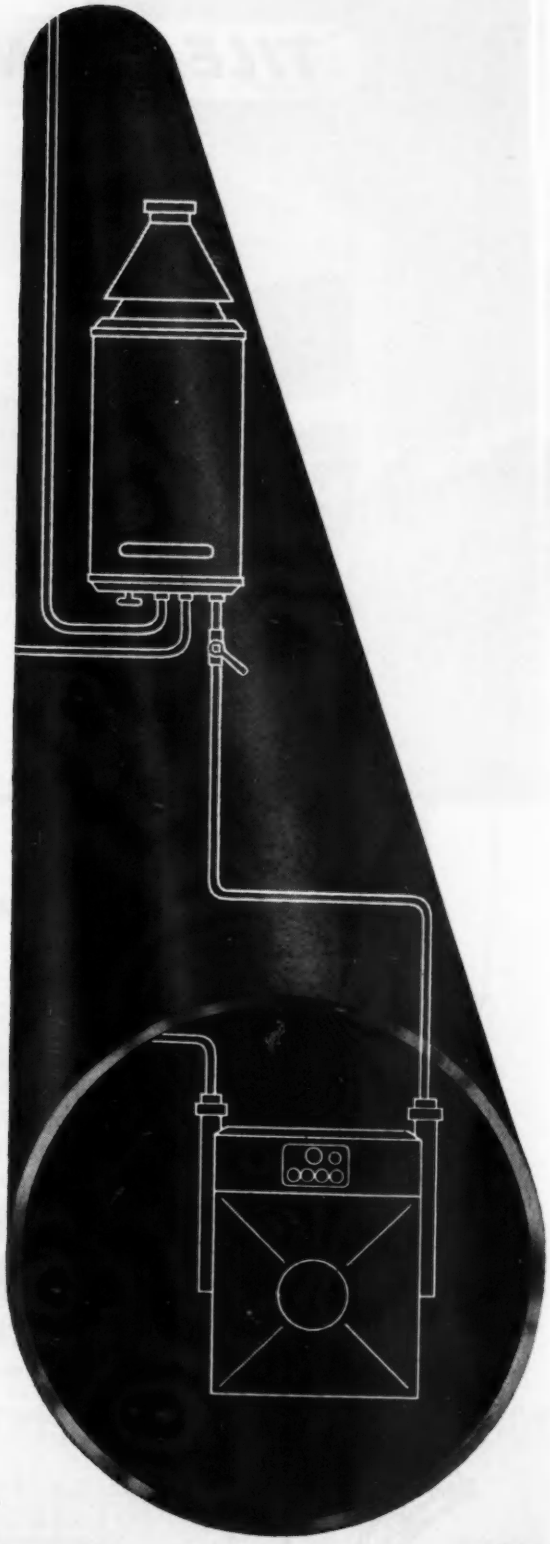
3 **Easily manipulated and installed.**

4 **Strong in relation to their light weight.**

5 **Neat in appearance.**



Whatever the building—farmhouse or factory; house, hotel or hospital—the job is better done with I.C.I. copper tubes.

IMPERIAL CHEMICAL INDUSTRIES LTD LONDON SW1

Fittings for copper tubes are made by Fyffe & Co. Ltd., Dundee, a subsidiary company of I.C.I.

ICI

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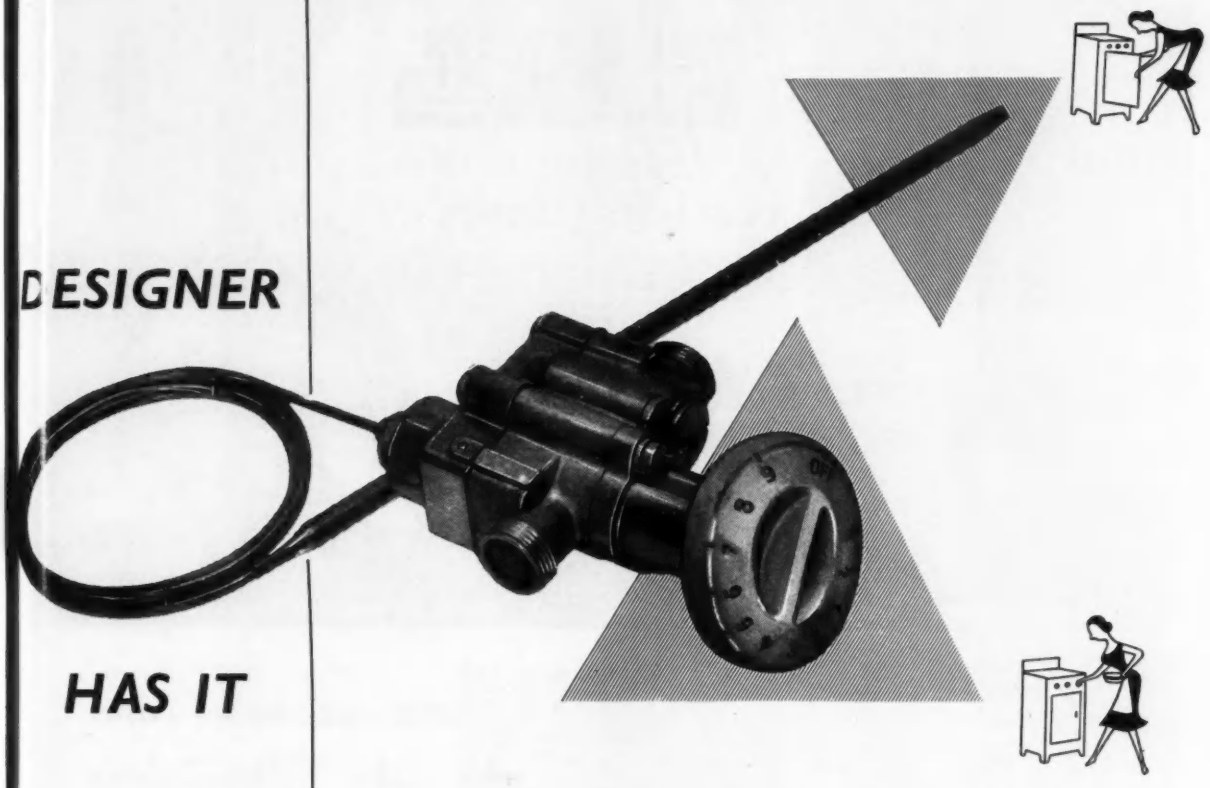
DESIGNER



HAS IT

BOTH WAYS

With this Teddington capillary type thermostatic control the designer has complete freedom to place the element where it will respond best to variations in temperature, and the main body of the instrument where it will look best and is most conveniently got at. This Teddington control, available with or without oven cock incorporated in the one compact unit, is in use in De La Rue (B6 and G5), Raymond, and Cannon (A125) cookers. Write for full details.

Teddington

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GAS COOKER THERMOSTAT

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THE LARGEST PRODUCERS OF AUTOMATIC CONTROLS IN EUROPE
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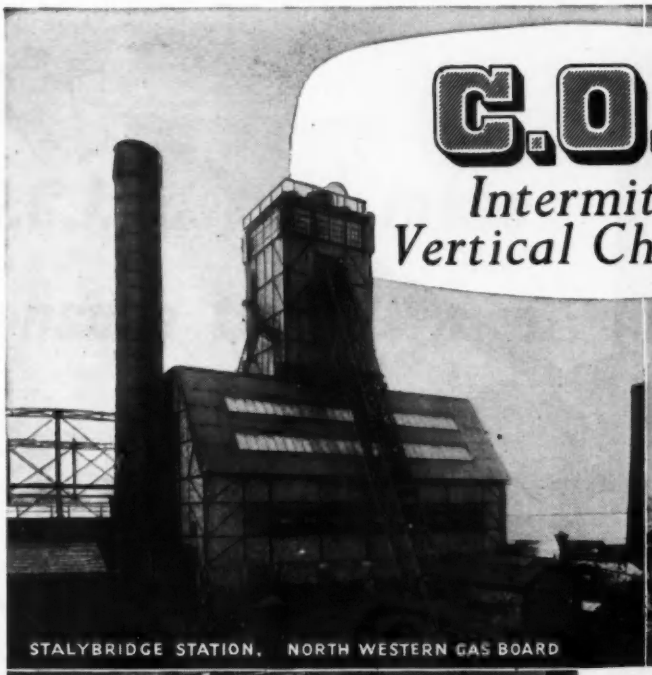
C.O.L
Intermittent Vertical Chambers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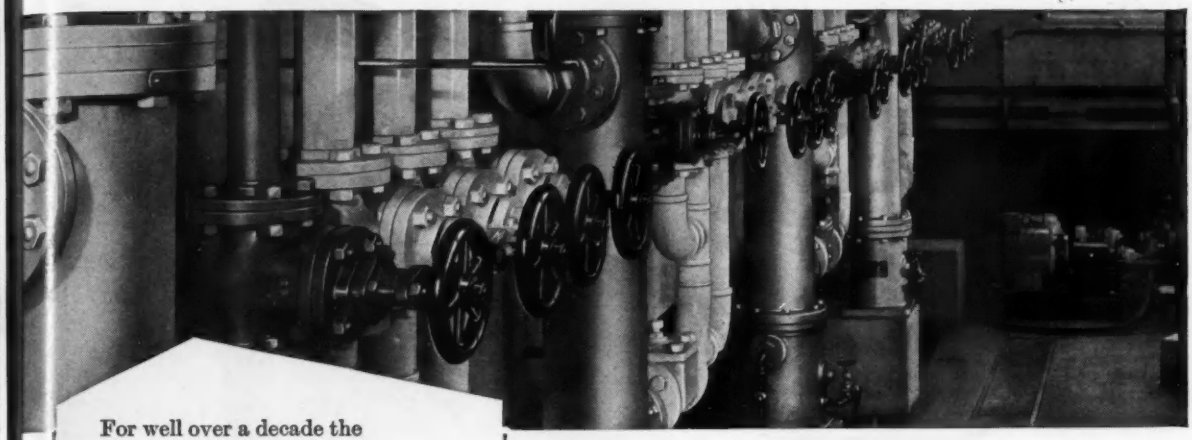

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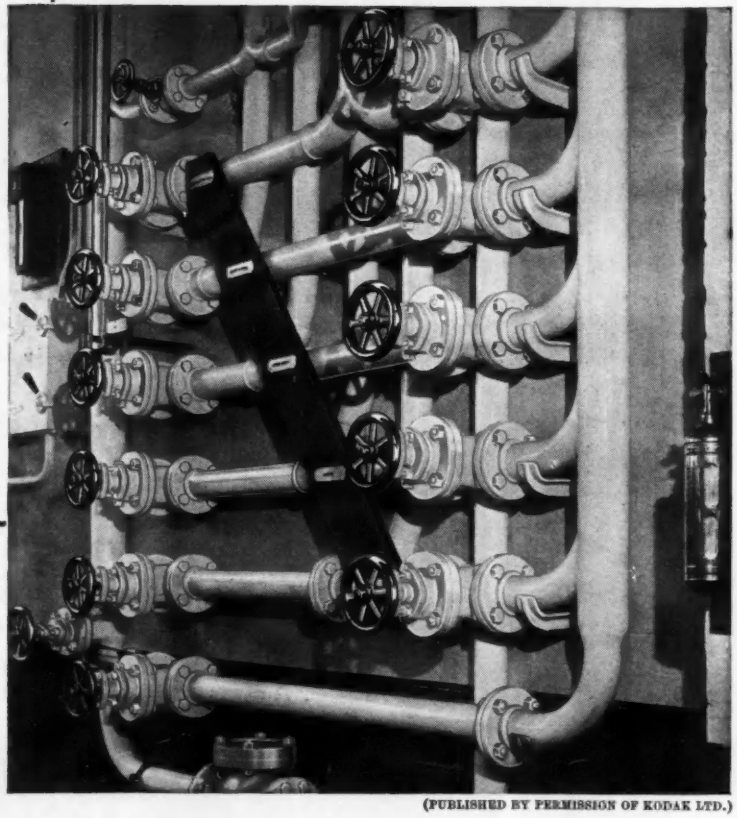

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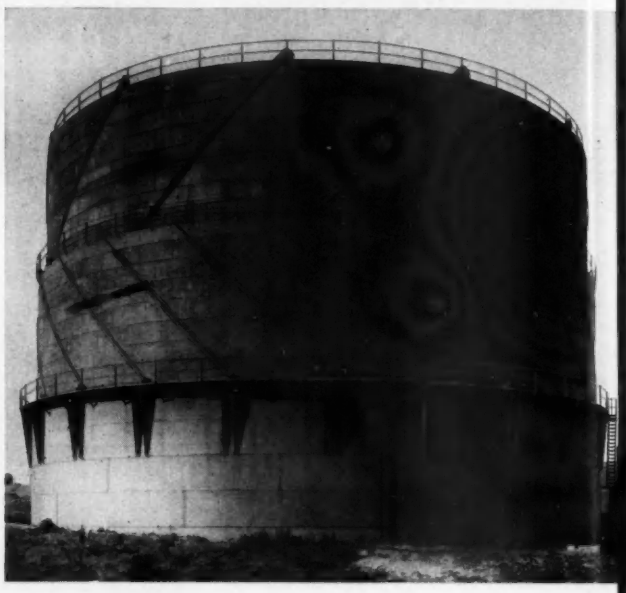

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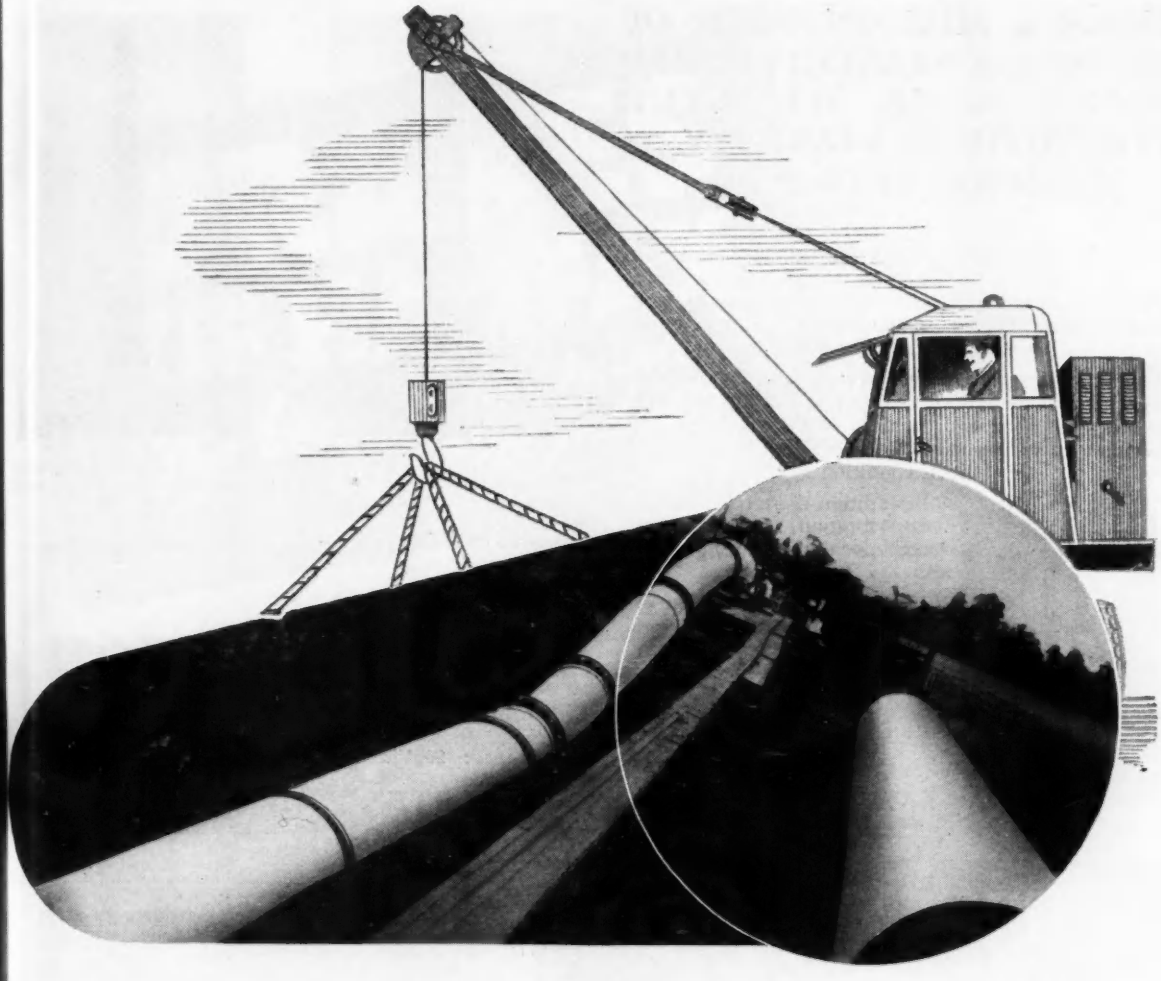

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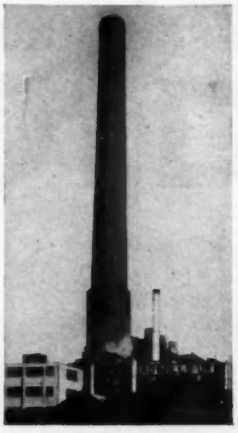

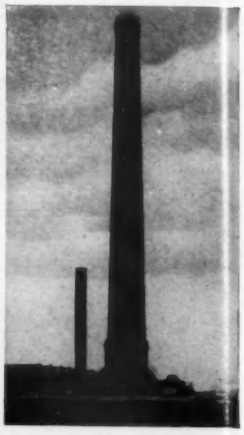

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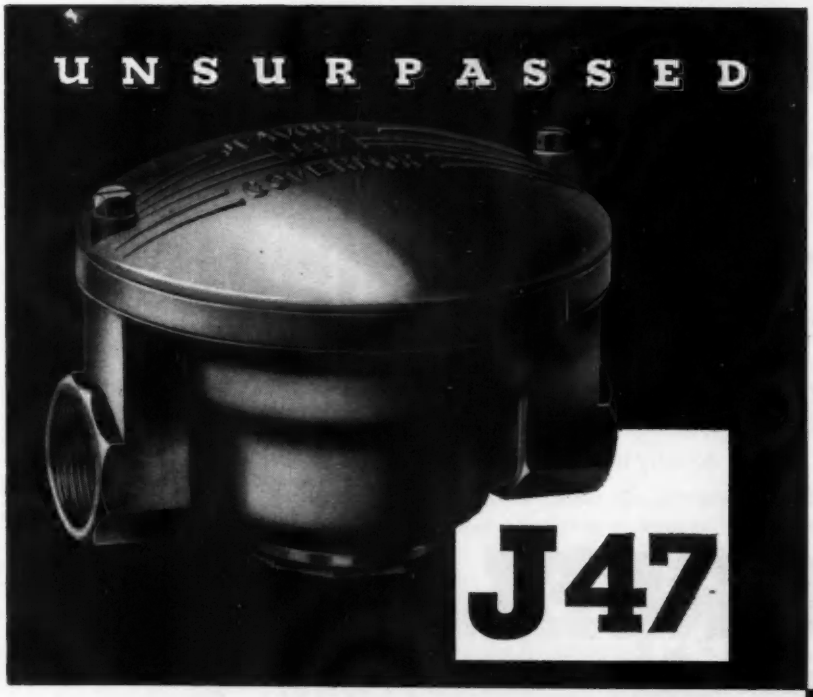

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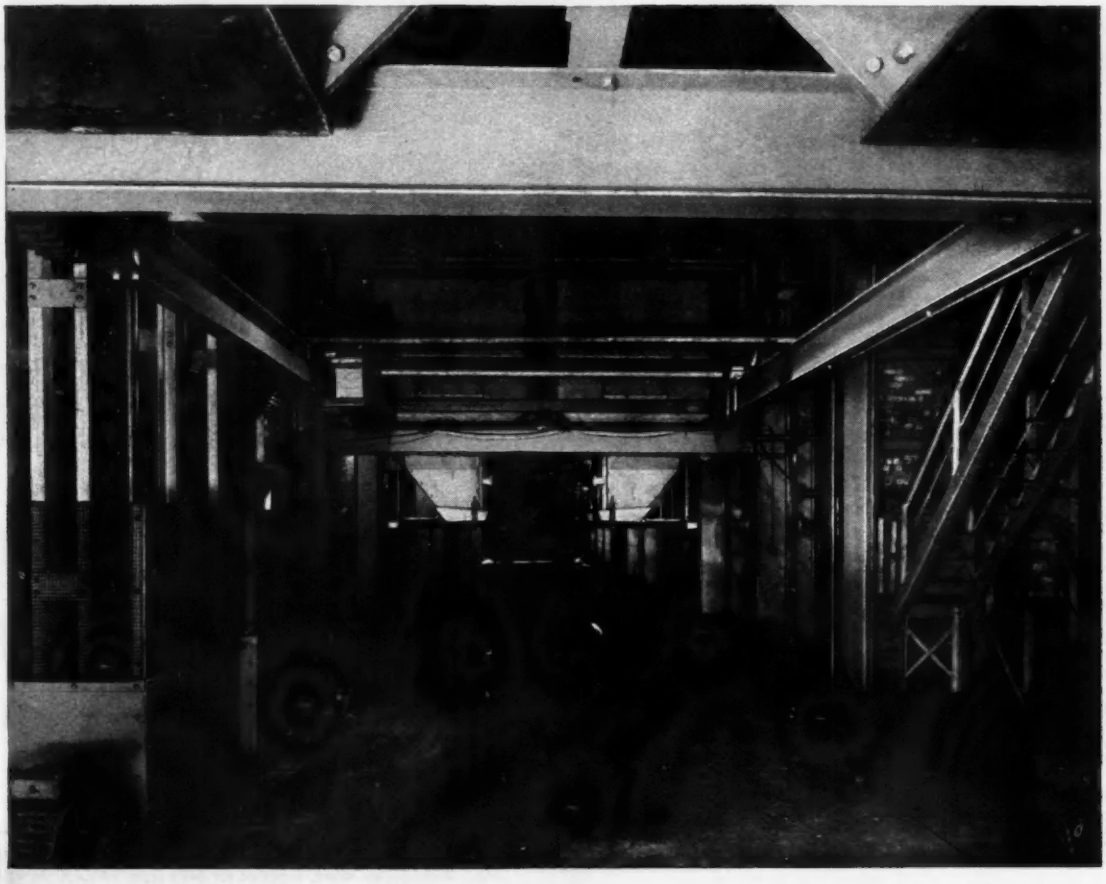

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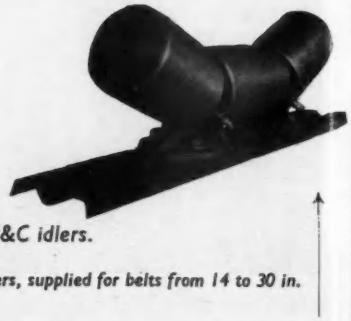

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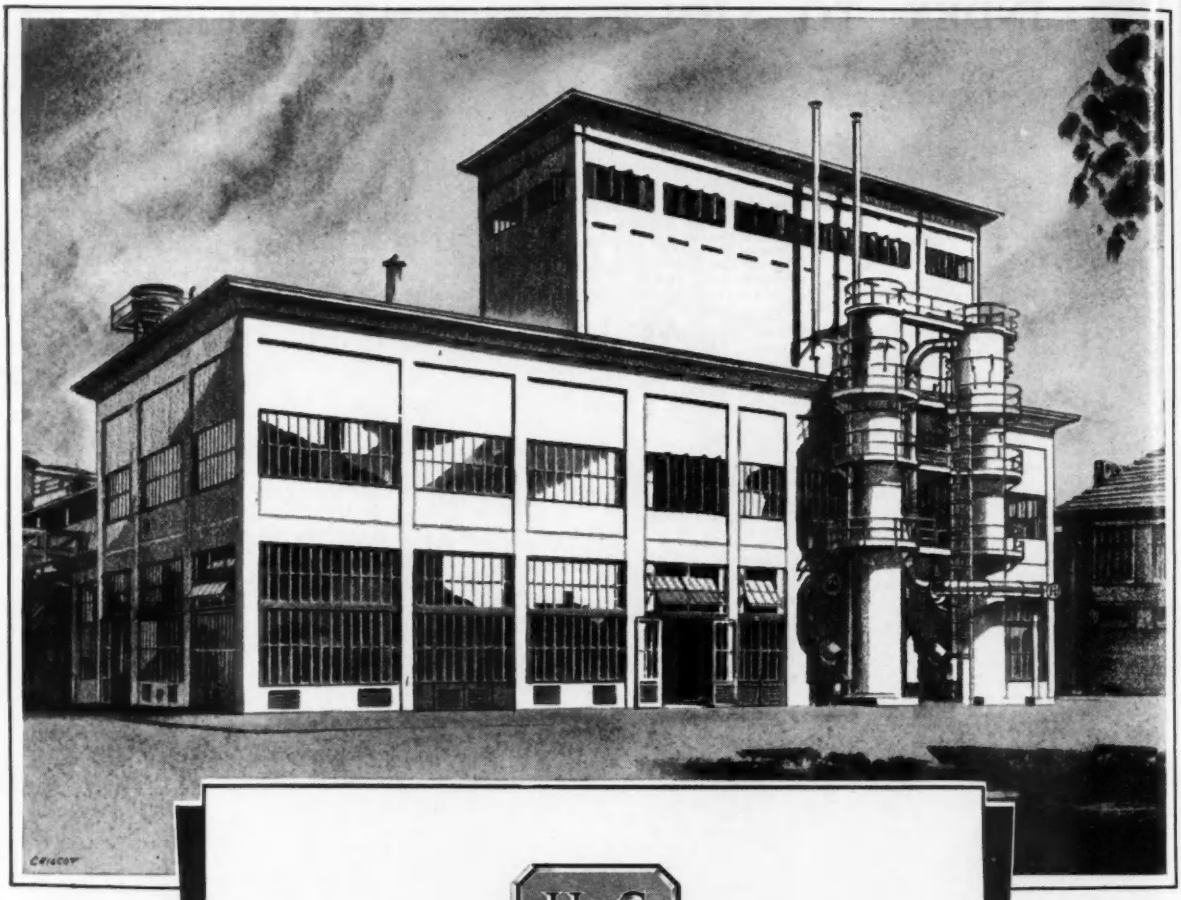

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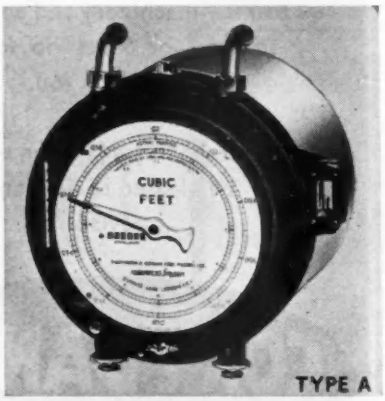

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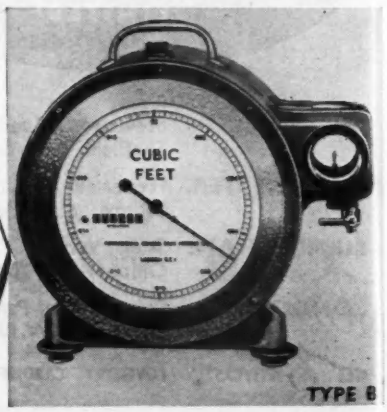

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THE IRISH SCENE

Much of this issue of the *Gas Journal* is devoted to the proceedings of the annual meeting of the Irish Gas Association at Waterford last week under the Presidency of Mr. John Ronan, Director of the City of Waterford Gas Company, and it will be gathered from our narrative of the event that the entire meeting was marked by success and that spirit of good fellowship so characteristic of the gatherings of the Association. Mr. Ronan has had a long association with the gas industry, and the survey of current affairs which threaded his address showed not only an appreciation of influences and trends but also an element of sure optimism in the future of the Irish gas industry. There were two papers at the meeting, one by Messrs. N. J. Robertson and H. C. Harrison, of the Alliance and Dublin Consumers' Gas Company, on a process for the gasification of heavy oil developed in France; the other by Mr. A. L. Allen, of the same company, on the interpretation of the efficiency of gas production, distribution and utilisation. All these communications will be found on later pages.

Referring to shortage of materials, spelling extended contracts periods for plant construction and other reconstruction activities, the President was able to report an easing of the situation latterly, but it is obvious that gas supply in Ireland during the past 10 years has called for flexibility of mind and a large measure of resource —to say nothing of the exercise of patience. During this period the Irish gas industry has had no easy time. Coal supplies have been a major difficulty; with lack of materials maintenance of gas-making plant proved a constant source of worry, and the difficulties of ensuring a supply of gas, however restricted, called for constant vigilance and no little ingenuity. The all-important subject of coal supplies and prices did in fact form the starting-point of Mr. Ronan's address. During the past year full supplies have been available, but over the last two years the price of gas coal has increased by 12s. 7d. a ton compared with an increase of 7s. 10d. for coal supplied for electricity generation—a difference of 4s. 9d. a ton which imposes a direct competitive handicap to the gas industry of well over £100,000 a year. And, as Mr. Ronan pointed out, the price of coal in Northern Ireland now approaches four times the 1939 average cost into works, while in Southern Ireland coal costs are even higher. This, of course, has had its repercussion on coke sales, and it is dismal commentary that coke prices have had to be related to the prices at which coke can be imported. To make up the loss of revenue, increases have been inevitable in the already high price of gas.

It is not surprising, therefore, that the thoughts of both technical and non-technical men in positions of responsibility in the Irish gas industry should be turning with more concentration towards complete gasification. Nor is it surprising that the problem should constitute another theme in Mr. Ronan's address and that the President should point out that present costs of coal and labour in Southern Ireland for making base load gas in traditional carbonising plant have risen to a point where they are in close relationship with the cost of gas made in carburetted water gas plants. To quote from the address: 'Broadly, a position has now arrived when it is financially sound to manufacture coal gas and water gas in proportions substantially to avoid producing coke for sale.' In this regard it is interesting to turn to the paper by Mr. Robertson and Mr. Harrison—a paper based on a pilot-plant at Cahors for the gasification of heavy fuel oil. Prior to the last war the average cost of coal into Irish gasworks was less than 1d. per therm, compared with gas oil at over 2d. a therm, and these margins established economic reason in favour of coal carbonisation for base-load production. Today, however, in Southern Ireland coal costs over 5d. a therm —practically the same price as heavy fuel oil. And, in the words of the authors, 'the relationship of these prices creates a new position in which the use of oil for base-load manufacture in lieu of coal becomes economically practicable, and it is likely to show advantage if the efficiency of cracking and associated costs are favourable as compared with the coal gas process.' Today oil is coming very much more into the picture of town gas manufacture, and the question of complete gasification of coal is assuming added significance.

GAS IN AMERICA

The excellent discussion of the Report of the Gas Industry's Productivity Team, who went to the U.S.A. in 1952, by the Wales and Monmouthshire Section of the Institution of Gas Engineers at Carmarthen, on September 10—see p. 776—was among a series to be continued. It showed what a lot of useful matter can be brought out and how valuable it will be to have this report discussed at leisure by the several Sections of the Institution and by several of the Junior Associations as well.

It has been said that the American gas industry is 'geared to natural gas.' Mr. E. M. Edwards in his admirable introduction to the discussion began with this fundamental characteristic of gas in the U.S., coupling it with two others. Natural gas forms 95% of the total supply. Sales of gas are four times those of 1934. And the average price of gas is no more than 5% above the pre-war figure. Striking facts indeed. A fourth might be added—that of the rapid expansion of the gas industry in a population which is growing at the rate of 5 to 7% per annum.

From the first of these facts it might appear that the British gas industry has not much to learn. The transmission of natural gas over vast distances has shown that much higher pressures can be carried safely than the maximum proposed in this country, but if we apply Mr. Edwards' 2,500 mile compass to Europe and the Middle East it will be well to consider the difference between the terrain which lies between its legs and that traversed by the vast pipelines of North America. Some of the corollaries of natural gas and long distance transmission are not readily assimilable in British practice. The fact that 78% of gas is distributed without passing through gasholders, while possibly explainable by the free use of alternative peak load plant, may also be accompanied by a prodigality in the use of an immensely rich natural supply which could have no parallel in the carefully nursed products of carbonising plant. And while high, or at least medium, pressure distribution is no new idea to British gas engineers (readers will remember, among others, the fine paper by H. J. Escreet in 1948, I.G.E. Comm. No. 337), it is not quite so easy where pressure must be generated with the expenditure of additional power as where it is a question of stepping-down from pressures already high at the source of supply. It is interesting to recall here that M. Kec, President of the French Gas Association, was this year urging upon his confrères the advantages of distribution at pressure of the order of 20 in., feeding consumers through reducing governors either at the service to each building or to each individual meter (*Gas Journal*, September 2, p. 585). Interesting, too, in the same address was the suggestion that one or other of the new plastic materials might be more suitable for the reticulation of the future than the metals hitherto employed, with the advantage that it would carry gas, clean and dry, giving rise to no dust, being supple and without joints. It is good to know that Mr. J. T. Haynes is arranging for trials of plastic tubes to be carried out at Bournemouth.

Quite a number of other valuable points were brought out in the discussion, which with its give and take of question and answer was more like a very agreeable conversation. Dr. A. B. Badger saw the immense difficulties of a standardised system of industrial relations over so vast an area of such complexity, the number of States differing in many points of detail in government, in an industry owned by such a wide variety of companies. There was not as much homogeneity in the American gas industry as we had even before vesting date. He warned us against their 'rigid contracts which neither party could vary except in very unusual circumstances. *Human beings are not like that.*' Still, as Mr. Edwards insisted, we have something to learn particularly in the careful instruction of the workman in safety precautions. One point which might perhaps be further discussed is the success of American companies operating both gas and electricity. Particularly interesting is the effect of this, and other similar influences, in the discouragement of electrical space heating in the U.S. The Fuel Conservation Report makes the definite statement that electricity is rarely used for space heating in the U.S. In some cases the electricity companies go to great lengths to divert space heating away from electricity, actively campaigning against its use for that purpose.

On the question of interchangeability of alternative gases it is rather surprising that no one seemed to be aware of the work done in France in the devising of means of controlling this. And that in spite of the prominence given to it in I.G.E. Comm. No. 404, M. Kec, on the Gas Industry in France, showing M. Delbourg's diagram and his 'Combustion Potential,' and referring to his test burner, which we have illustrated in the '*Journal*.' But it was evident that the meeting was pre-occupied, as indeed we all should be, by the over-riding menace of the impending exhaustion of the world's fossilised fuel resources, whether in the form of oil or of coal. In this connection it is to be hoped that future discussions will combine this report with that of the Specialist Team on the Conservation of Fuel, Heat, and Energy to which we have devoted, we think rightly, so much of our space. The point that has impressed the Junior Vice-President of the Institution of Gas Engineers, Mr. W. K. Hutchison, more than any other was the statement that the existing known reserves of natural gas in America were equivalent to about 25 years availability and that supplies would apparently decline during the next 50 years. Mr. Edwards had found that the increase in the sale of natural gas was becoming greater than the discovery of new fields. It is characteristic, we fear, of the tremendous energy of the American people, in their rich and prosperous country with vast natural resources, that they are lavish in their use of a thick bed of coal near the surface, their hydro-electric power (not so bad because here there is no question of exhaustion), their oil resources, and their gas. It is all of a piece with what one writer has called that 'robber economy' which may very well end in the ruin of our Western civilisation. No wonder that the thinking American is alarmed at the prospect, straining every nerve in the search for alternative fuels, alternative sources of power. What we should not miss is the fact that the vast resources in coal alone of the United States of America will outlive those of Britain. We have to consider very carefully and urgently what steps

we can ourselves take to conserve our own resources, practically confined to coal—a problem of the deepest concern to the nation.

UNNECESSARY WASTE

Much has been written and a great deal has been said about the saving to the individual householder and to the nation in general if only a modicum of insulation were applied to housing construction in this country. We use the word 'were' because it almost implies frustration; perhaps 'was' would have been more appropriate, because this at least does indicate a probability cause. We have written at some length during the past fortnight on the Report of the British Team which visited the United States of America to study (by two-way exchange) the problem of fuel conservation—a problem more acute, more vital, in the United Kingdom than in the States. We make no apologies for returning to a particular aspect of the report, which we have been pleased to notice has received widespread attention in the National Press; as example *The Observer* of September 13 really 'went to town' about it, discarding all other editorial comment.

'In the conservation of fuel there is probably no single factor that has such common application in industry and is more important than insulation.' We quote from the Productivity Team's report. Now the function of thermal insulation has been understood for a very long time, and we have had on the subject many a thesis fully qualifying for a degree in the Philosophy of Fuel Technology, should such a PH.D.F.T. exist. There has also been much practical investigation in the field; and if we single out the work of the Building Research Station of the D.S.I.R., we are sure that other organisations engaged on the same type of investigation will bear us no grudge, though it is, perhaps, too much to expect from them their views, which would be welcome to us and enlightening to our readers. All the more remarkable therefore, in view of what we have just said, that the financial benefits which would accrue by the elimination of preventable heat loss by means of effective insulation have received such scant recognition.

The British Productivity Team under the leadership of Mr. W. L. Boon was primarily concerned with fuel conservation in industry. Though domestic dwellings were not within the compass of the Team's investigations, the report does in fact emphasise in no uncertain way what savings could be made, and what fuel conservation could be effected, by attention to insulation—and at low cost. But let us first have regard to industry and point to what the Team has to say about insulation in this sphere. It holds, for example, firmly to the view that in steam engineering alone, where insulation is a commonplace, there is considerable scope for quite substantial gains in fuel economy if existing installations were to be investigated to determine where preventable heat loss is occurring. When it comes to industrial buildings there can be little doubt that, in regard to insulation, and hence fuel conservation, the United States is far in advance of the United Kingdom. Of course, climatic conditions have their influence, but the essence of the matter is that the workers in that very wealthy silver-spattered country demand high standards of comfort in the factory.

They also demand high standards of comfort in the home. How much this is due to what we might loosely express as feminine pressure, charm, wit, or even culture, we are not in a position to evaluate. In an uninsulated home in Great Britain at least 25% of the heat escapes through the roof and ceiling construction, and about 70% of this loss is prevented if the roof is insulated in a simple manner—*i.e.*, by placing a simple, cheap, and convenient form of insulating material between the roof rafters and above the ceiling. If we take glass wool as a good example, this material, felted with bitumen to a convenient mat which can be draped over the ceiling joists, can save 90 therms of the heat output of a normal three-bedroom house per heating season of 33 weeks for an expenditure of under £10. If, in addition to the roof insulation, the walls of a dwelling are effectively insulated, then the saving per heating season would be of the order of 130 therms. The cost of insulation is so relatively small, and the potential saving so great, that the Team is convinced that any State grants made in the future for building construction should be conditional upon the attainment of a recognised standard of thermal insulation. In brief, the Team considers the application of thermal insulation in all its forms to be one of the greatest potential sources of fuel saving, and is confident that at least some 5 mill. tons of coal per annum could be saved by insulation—reasonable and practical insulation. There seems to be little reason to doubt that American practice in this regard is considerably ahead of ours notwithstanding the absence of the compelling motive of fuel economy.

NEW METHOD IN COMBUSTION RESEARCH

'Nothing strikes the technical visitor to the United States of America with greater force than the enormous part played by research and development in the progress of American business.' This is from the report of the British Team which, under the leadership of Mr. W. L. Boon, visited America under the auspices of the Anglo-American Council on Productivity. Apart from Government research, this is particularly evident in the fuel producing and marketing organisations, which carry or sponsor large experimental laboratories concerned not only with improvement in methods of production but also—and this is perhaps more important—with the efficient utilisation of fuel. The report mentions an interesting new method in combustion research which was witnessed by the Team during a visit to one of the large boiler and stoker manufacturers. This was the use of high-speed colour cinephotography for the elucidation of fuel-burning problems in the actual boiler furnace. Films so obtained can be screened in slow and accelerated motion for the benefit of the investigator, and the Team was able to see a film demonstrated in this way. Of particular interest was the fact that an elusive and unsuspected fault in a primary air fan was discovered by this means. This new technique, it is reported, was most impressive, and we learn that the technique is now being applied in the United Kingdom. It would appear that it could with advantage be employed also in the analysis of combustion conditions in metallurgical furnaces, irrespective of the fuel used.

FRANCE is to receive 80,000 tons of coal-tar pitch from the U.S.S.R. during the year to June 30, 1954. This is one of the provisions of a recent trade agreement between the two countries. France will also receive from Russia essential oils valued at 90 mill. francs and an unspecified amount of pharmaceutical products. French exports to Russia will include essential oils valued at 260 mill. francs.

Personal Notes

MR. J. E. SAUNDERS, M.B.E., United Kingdom Trade Commissioner Designate for the Maritime Provinces and Newfoundland, visited George Wilson Gas Meters, Ltd., at Coventry on September 14. He was given an insight into meter production and the technicalities involved in the course of a visit of inspection under the guidance of Mr. W. D. Wilson, Managing Director, and Mr. D. C. E. Poole, Technical Director.

MR. GEORGE W. ALLEN, Editor of the *Canadian Gas Journal*, will retire at the end of October after serving that journal (the official medium of the Canadian Gas Association) for 35 years, a period which he understands constitutes a record for any gas organisation in the world. His association with the gas industry dates from 1900, and he was for some years with the Consumers' Gas Company of Toronto as advertising manager, educational director, and in charge of sales promotional work. MISS IRIS NAISH, who has been appointed to succeed Mr. Allen as Editor, has had many years' experience in newspaper and radio fields in Toronto and in the national publicity field. She has been associated with the *Canadian Gas Journal* for the past few months.

MR. A. R. FLUDE, who recently joined the sales staff of R. & A. Main Ltd., has, following a period at head office, now taken up duties as representative to the North Eastern Gas Board. Educated at the Eastbourne Grammar School, Mr. Flude began his service with the gas industry in 1930 with the Eastbourne Gas Company, and after training was appointed to the sales staff. As a Territorial soldier he was called to service at the outbreak of the second world war with the Sussex and Surrey Yeomanry. In 1940 he was commissioned and transferred to the Heavy Anti-Aircraft Artillery. After demobilisation, he was appointed Showroom Manager at the Seaford undertaking.

MR. R. G. PAYNE has been appointed by R. & A. Main Ltd., as Southern Sales Manager, and took up his duties at head office on September 7. Educated at Felsted, he began his business career with Mann, Egerton & Co., Ltd., of Ipswich. On the outbreak of war in 1939 he volunteered for army service and was commissioned in the Royal Army Service Corps, serving in the Middle East and Europe, and being awarded a Mention in Dispatches. Mr. Payne joined R. & A. Main Ltd. in 1947 and represented them in the North Eastern Gas Board area and, in addition in part of the East Midlands Gas Board area until 1952, until taking up his new appointment. In 1951 he organised the formation of the Nor Reps Golf Circle and became one of its joint hon. secretaries.

MR. J. D. REES, of Kidwelly, has been appointed manager of Llandovery gas undertaking under the Wales Gas Board, in succession to the late Mr. W. Spowage.

MR. W. L. HEYWOOD, O.B.E., has been appointed by the Lord President of the Council to be a member of the Advisory Council for Scientific and Industrial Research from October 1. Mr. Heywood, who is 52, is General Secretary of the National Union of Dyers, Bleachers, and Textile Workers, and is also Secretary of the National Association of Unions in Textile Trades. MR. E. FLETCHER retires from the Advisory Council on September 30 on completion of his period of membership.

MR. W. H. DREAPER, Superintendent of the British Columbia Electric Company, Gas Division, Vancouver Island South, Victoria, B.C., will retire at the end of September, having completed more than 43 years service. He relinquished the position of Plant Superintendent of the Company's Vancouver operation in 1932 to take up the Victoria appointment. He received his early training in several of the various shops and drawing office of Ashmore Benson Pease & Co., Ltd., and Power Gas Corporation, Ltd.; by personal tuition of the late Mr. Matt. Dunn, Manager of Stockton-on-Tees Corporation Gasworks, and at Leeds University. Mr. Dreaper is a Member of the Institution of Gas Engineers, the Canadian Gas Association and the Pacific Coast Gas Association.

Obituary

MR. HARRY HOPKINSON, formerly Secretary of the Chester United Gas Company (now part of the North Western Gas Board) died on September 13, aged 75. A native of Bury, Mr. Hopkinson joined the company's staff as clerk in 1898, and four years later was promoted to the position of chief clerk. On the death of the secretary of the company, Mr. Frederick A. Pye, in September, 1926, Mr. Hopkinson was appointed to fill the vacancy, and held that office until his retirement in October, 1944. For many years, he represented the company on the Manchester District Committee of the British Commercial Gas Association. He took a leading part in the company's rapid growth and development during the period in which he served as secretary. At the time of his retirement sales of gas per year totalled 755 mill. cu. ft., as compared with sales of 182 mill cu. ft. in 1898.

Whitehaven Miners have approved the National Coal Board's plans to close William pit, Whitehaven, where 104 men lost their lives in an underground explosion in 1947. Coal Board officials have decided that the seam can be more economically worked from the nearby Harrington No. 10 pit. Meanwhile experiments are being carried out at the William pit for methane gas drainage on similar lines to those successfully adopted at Haig pit, which is now supplying methane gas to the Northern Gas Board for mixing with the domestic gas supply. It is possible that William pit will become the main drainage point for methane gas and will also be used as a ventilation shaft.

Diary

Sept. 21-24.—INTERNATIONAL ROAD TAR CONFERENCE, May Fair Hotel, London.

Sept. 25.—MANCHESTER AND DISTRICT SECTION, I.G.E.: Visit to Petrochemicals, Ltd., Irlam, Manchester.

Sept. 26.—EASTERN JUNIORS: Presidential Meeting at Ipswich.

Sept. 26.—NORTHERN JUNIORS: Visit to Keswick Gasworks to inspect modernised retort house.

Oct. 1.—NORTH OF ENGLAND SECTION, I.G.E., and NORTHERN JUNIORS: Joint meeting. Discussion on Report of Gas Industry Productivity Team's visit to the United States. W. H. B. Porter and D. J. Colvin will answer questions. Northern Gas Board Assembly Hall, Market Street, Newcastle-upon-Tyne, 2.30 p.m.

Oct. 1.—SCOTTISH JUNIORS (Western): Jubilee Dinner, Glasgow.

Oct. 2.—SCOTTISH G.C.C.: Scottish Gas Board Offices, 26, Drumsheugh Gardens, Edinburgh, 11.30 a.m.

Oct. 3.—YORKSHIRE JUNIORS: Annual General Meeting; Address By J. G. Tilley, Group General Manager, Huddersfield-Halifax Group, Bridge Street, Leeds, 2.30 p.m.

Oct. 6.—MIDLAND JUNIORS: Presidential Address: J. A. Tomes (Stourbridge); Birmingham.

Oct. 6.—SOUTH EASTERN G.C.C.: Caxton Hall, Westminster, 2.15 p.m.

Oct. 7.—SOUTH WESTERN SECTION, I.G.E.: Annual General Meeting, Bristol.

Oct. 7.—INSTITUTE OF FUEL: Melchett Lecture, 'The Domestic Appliance Industry and Fuel Usage,' Dr. Harold Hartley, C.B.E.; Institution of Mechanical Engineers, Storey's Gate, 5.30 p.m.

Oct. 9.—SCOTTISH JUNIORS (WESTERN): 'Some Notes on Starting up a Continuous Vertical Retort Plant,' A. F. Cottrell (Woodall Duckham Co., Ltd.), Royal Technical College, Glasgow.

Oct. 9.—LONDON JUNIORS: Opening Meeting. Presidential Address, W. Johnson. 178-180, Edgware Road, W.2. 6.30 p.m.

Oct. 10.—SCOTTISH (EASTERN) JUNIORS: Opening Meeting. Presidential Address, G. Cobb. Dunfermline.

Oct. 10.—INSTITUTION OF CHEMICAL ENGINEERS: Joint meeting of North Western Branch and S.C.I. Chemical Engineering Group, George E. Davis Memorial Lecture, Norman Swindin, Manchester.

Oct. 14.—WALES GAS BOARD: Inauguration of Maelor Gasworks, Wrexham, by Lord Lloyd, Under Secretary of State for Welsh Affairs.

Oct. 14.—INSTITUTION OF HEATING AND VENTILATING ENGINEERS: 'Conservation of Fuel, Heat, and Energy: Report of U.K. Team to U.S.A.,' W. L. Boon, E. G. Ritchie, and L. Copeland Watts; Institution of Mechanical Engineers, Storey's Gate, 6 p.m. Members of the Institution of Gas Engineers are invited to attend and take part in the discussion.

Oct. 17.—MANCHESTER JUNIORS: Annual General Meeting; Presidential Address by J. Oates; Visit to Rochdale Gasworks.

Oct. 19.—WEST MIDLANDS G.C.C.: Dudley Room, Queen's Hotel, Birmingham. 2.15 p.m.

Oct. 20.—LONDON AND SOUTHERN SECTION, I.G.E.: Annual General meeting. 'An Accountant in the Gas Industry,' L. W. Smith; 17, Grosvenor Crescent, S.W.1, 2.40 p.m.

Irish Gas Association Meeting

OVER 100 delegates, including many from England, attended the annual Irish Gas Association conference at the Municipal Theatre, Waterford, on Wednesday last, September 16. Mr. J. Ronan, Director, City of Waterford Gas Company, President of the Association, was in the chair; and he was supported by, among others, Mr. J. T. Haynes, President, and Dr. W. T. K. Braunholtz, O.B.E., Secretary of the Institution of Gas Engineers, and Sir John Stephenson, C.B.E., Chairman of the Eastern Gas Board. The delegates were officially welcomed by the Mayor of Waterford, Councillor F. P. Browne, who bade those present a Chead Mile Failte (a hundred thousand welcomes) to the historic City of Waterford. In his opening remarks, Councillor Browne mentioned that it was 20 years since the Association last held a convention at Waterford. In the succeeding years great strides forward had been made; indeed, it was no exaggeration to say that an industrial revolution had taken place; and he expressed the hope that industrialists would continue to appreciate the advantages of Waterford with its splendid harbour and central position.

'In all our housing schemes,' added the Mayor, 'we have placed gas at the tenants' disposal, and in the last 20 years we built in Waterford approximately 1,500 houses. This I know will be of great encouragement to the Association. I hope that by the results of your meeting the whole country will benefit.'

The President, who welcomed the Mayor on behalf of the Association, said it gave him great pleasure to do so as there was close co-operation between the Association and the Corporations of Cork and Waterford. Welcoming the delegates, Mr. Ronan remarked that he was honoured to see such a large gathering of industrial representatives at the conference.

Presidential Address

Mr. Ronan then delivered his Presidential Address—see p. 768, overleaf.

Mr. George Walmsley (Derry, Past President of the Association) said they had been told that the Association met in Waterford 20 years ago. In fact, he was one of the last surviving members of that meeting. Mr. Ronan had a close association with the gas industry in Cork and Waterford and in addition he was a solicitor of high repute—in brief, an admirable man to serve on the board of any gas undertaking. He himself, continued Mr. Walmsley, shared the hope that atomic energy might be harnessed for power, and he thought the results would not have the adverse effects that some people anticipated. Development of atomic energy would result in coal that was now going into industries being made more plentiful for the gas industry.

'A certain amount of pressure,' said Mr. Walmsley, 'should be brought on the Governments in both the North and the South of Ireland to see if they can bring down the price of coal, as we all know that 5s. per ton of coal represents a substantial amount in the price of gas, and we are nearing the time when it will not be as easy to sell as it is at present. While we have great competition, I think there are tremendous possibilities available for water heating, and I think that our Association should make representations to the Governments to do all they can to bring the present price of coal down, or else reduce the cost of freight. Mr. Ronan is maintaining the traditions of this old Association, and we are very grateful to him for all that he has done in the past 12 months,' concluded Mr. Walmsley as he presented Mr. Ronan with the Presidential Medal.

Mr. Ronan replied to the vote of thanks.

The report of the Council for the year ended July 31, 1953, was then submitted by Mr. N. J. Robertson, who, in regard to changes in its membership, expressed sorrow at the death of Mr. H. Bennet, of Alder and Mackay, Ltd., who died in March of this year.

The total membership at July 31, 1953, was 139, including nine life and honorary members. Since then five new members had been accepted by the Council, making the number 144.

The annual accounts, which had been circulated, showed that during the year subscriptions received were £98 and after meeting expenses there was a surplus of £102 which, together with the balance brought from the previous year, resulted in the bank balance amounting to £497. The Benevolent Fund with interest stood at £106.

Election of Officers

The following officers and committee were proposed for election for 1953-54:

President: R. F. Pollock (Enniskillen).

Senior Vice-President (South): S. L. Doyle (Cork).

Junior Vice-President (North): Name to be submitted later.

Committee (South): T. F. Broderick, J. O'Regan, S. L. Doyle, F. K. Thomas. *(North):* R. F. Pollock, T. F. Hastings, F. Clegg, G. Walmsley.

Secretary and Treasurer: N. J. Robertson.

Secretary, Northern Section: W. H. Ainsworth.

Auditor: W. Cole.

Technical Fare

Two papers were presented at the meeting. First was on 'Efficiencies and Gas Sales,' by A. L. Allen, of the Allied and Dublin Consumers' Gas Company (see page 773); the other was a joint paper by N. J. Robertson and H. C. Harrison, also of the Allied and Dublin Consumers' Gas Company (see page 770) on 'Fuel Oil Gasification by the O.N.I.A.-G.E.G.I. Process.' The meeting's timetable did not allow for discussion on either of these papers.

On Mr. Allen's paper, Mr. F. K. Thomas (Limerick), in thanking the author, commented that, from Mr. Allen's remarks, governors should be fitted to all appliances and in particular on water heaters. Some manufacturers were represented at the meeting, and he hoped they would regard it as imperative that governors should be fitted. Concluding his brief vote of thanks, Mr. Thomas said: 'Our young members are responsible for the installations and sale of these appliances and we are guilty in not ensuring that the younger members are present at the meeting, for they are the backbone of our Association. The industry depends on the encouragement we give to our younger staff.'

In a vote of thanks to Messrs. Robertson and Harrison, Mr. John T. Haynes congratulated Mr. Robertson and his Company for making their investigations available to the gas organisations both in Ireland and in England. 'This paper,' continued Mr. Haynes, 'is most timely and one that is causing much interest on our side of the water. Only yesterday I paid a flying visit to a plant using heavy oil. The Gas Council has done a considerable amount of research on these lines and the Council will make available to the whole of the industry the knowledge it has accumulated. Any discoveries that will accrue will be passed on to our colleagues in Ireland. Assuming that future supplies of catalysts will be necessary, I understand that the type of catalyst used in this plant is a secret known only to the Frenchmen. I wonder if it is wise to put all our eggs in one basket—as we have with the coal. Would it not be wise to put our eggs in another basket—the oil basket?'

Mr. G. Gresle Farthing, Humphreys and Glasgow, Ltd., explained the O.N.I.A.-G.E.G.I. plant was associated with his firm. It was true that catalysts of various types were being developed, but they knew all about them; and he would assure those present that there was in fact no secret about the development of the process.

Speeches at the Annual Dinner

The annual dinner of the Association was held at the Grand Hotel, Tramore, on the evening of September 16, the toast of 'Ireland' being proposed by the President of the Association, Mr. John Ronan.

The Mayor of Waterford, Councillor F. P. Browne, proposing the toast of the 'Irish Gas Association,' thanked the Association for inviting him. 'I hope that 20 years will not pass before you have your next conference in Waterford,' he said. 'And even though in the event that may prove to be the case, I hope I shall have the honour—if, indeed, I live till 1973—of renewing the friendships during this memorable meeting.'

Mr. Ronan, replying to the toast, said the Waterford Corporation was the Gas Company's biggest customer, and it was the Company's object to satisfy their customers. As a result of the services that the Company had given in Waterford in recent years it had greatly increased its load. He knew that the Mayor and the Corporation acknowledged the Company's services in this regard. Concluding his remarks, Mr. Ronan paid tribute to Mr. Robertson's work as Secretary of the Association.

Mr. N. J. Robertson, proposing the toast of 'The City of Waterford and the City of Waterford Gas Company,' commented that the big gathering of members was tribute not only to the President of the Irish Gas Association, but also to the City of Waterford and the City of Waterford Gas Company. As far as the gas industry was concerned it rightly looked forward to the future with optimism and confidence.

Mr. Benjamin Haughton, Chairman of the City of Waterford Gas Company, replying, said Waterford had gone ahead by leaps and bounds, and more and more gas was being consumed, due to the foresight of those managing the City.

(*Continued on p. 785.*)

THE IRISH GAS INDUSTRY

PRESIDENTIAL ADDRESS TO THE IRISH GAS ASSOCIATION BY

JOHN RONAN,

LL.B., Director, City of Waterford Gas Company.

WHEN your Council invited me to become your President for the year 1952-53, I must confess I was in considerable doubt as to my qualifications for the office. I was aware that, following developments elsewhere, and in particular the example of the Institution of Gas Engineers, your Association now welcomes into membership not only gas engineers but all attached to the Irish gas industry who may advance its status. I am not a gas manager, engineer, chemist, or any sort of technical man, and it would be presumptuous for me to justify my acceptance of this high honour on the usual grounds that such men can properly advance. My qualifications for this office, if qualifications I may call them, are solely to be found in a long association with the industry and a desire to serve it, and if, during my term of office. I have done so in worth while measure, I am well pleased.

An Effective Means for Collaboration

Throughout my year of office I have come to an appreciation of the advisability for matters of importance to the industry to be dealt with in a co-ordinated manner, and my first task, therefore, is to commend the Association to you, if only for that purpose. It is self-evident that the gas undertakings of this country have many common interests and the need increases for us to speak with one voice. It is truly said that 'unity is strength,' and the first requirement for unity is an effective means for collaboration. If you will consider for a moment what functions the Association performs you will realise that it is the sole organised link between the gas undertakings in Ireland. It is the only medium for collective consultation. It is the one forum of technical discussion in the Irish gas industry. It is the obvious guardian and advocate of the industry in any vital issue which may arise.

Additional to these considerations of the mundane and material, real though they are, it is a fact that men do not only combine together for their business or advantage. The atmosphere of goodwill and freedom from formality, for which these annual meetings are noted, promotes accord throughout the industry, and the presence of so many old friends from across the water, year after year, is evidence that it is not only we in Ireland who find it a pleasurable and enjoyable event.

The past year has seen continuation of the post-war adjustment period, in which monetary inflation, greatly accelerated by the war and its aftermath, and shortage of materials, have been the cause of most of our difficulties. Shortage of materials, with its accompaniment of extended contract periods for plant construction, has delayed the final rehabilitation necessary after the stringencies of the last 10 years. This feature, however, has now improved considerably. Difficulties or not, shortages or no shortages, we have to meet the gas demand whatever it may prove to be; but perhaps the challenge to us is not entirely a disadvantage. At least it has demanded flexibility in our thinking, and the rapidity with which circumstances have changed has left no opportunity for us to become set in our ways.

Impact of Atomic Energy

While it is a matter of much greater import than affects our industry—or even this country—it is abundantly clear that there remains a paramount need for monetary stability. A glance backward will bring realisation of how fully we have been occupied in meeting the problems of the war and adjustments of conditions during the past five or six years. In the meantime, technological advance in every sphere has continued at a pace and on a scale we scarcely realise, and we must keep abreast of invention, technology, and 'know how,' not only as affects the gas industry directly in the productive sense, but also to ensure that our methods and installations are not outdated or opportunities for new business lost through ignorance. The implication of the industrial potentialities of, for instance nuclear-physics, or even gas turbine engineering, is normally dismissed by us as remote. At present the secrecy surrounding research taking place on atomic industrial applications leaves us unable to assess its possible ultimate impact on established fuel industries. Its effect may, however, be momentous, and not necessarily to our industry's disadvantage. If, as it appears possible, atomic energy is developed industrially to supply major power demands at present dependent on coal, it would seem to follow that coal availability would increase to that extent.

Having thus brought my opening remarks to coal, with which any review of the gas industry should properly commence, it is pleasing to report that during the year full supplies were available. It is necessary for us to be cautious with warnings of a difficult winter ahead and past shortages fresh in mind; nevertheless I feel that we must admit having come a fair distance towards the relative Utopia of normal conditions which we looked forward to for so long. As to prices, however, our story is not a happy one. Production costs of coal in Great Britain have risen continuously, and the burden has been transferred to the user. In the case of our industry, wherein coal is the dominating raw material, prices of gas have necessarily risen also, and the damage to our competitive power is a cause for great concern. In the North, where prices follow the pattern of British gas undertakings, there have been additions due not only to higher mining costs, but also to give effect to a new coal price structure introduced by the National Coal Board, which purports to assess the values of different descriptions of coals more fairly, but which is, in effect, an arbitrary adjustment adding to the prices of gas coal and deducting from the prices paid by the electricity industry.

Over the last two years gas coal has increased by 12s. 7d. per ton, against 7s. 10d. for electricity. The additional cost, represented by this difference of 4s. 9d. per ton, to the gas industry in Ireland is equal to well over £100,000 per annum. The price of coal in Northern Ireland now approaches four times the 1939 average cost into works, and in Southern Ireland coal costs are even higher. This portion of the country is regarded by Great Britain as an 'export area,' and prices are charged on the basis of what can be secured in international markets. Hitherto it has been a seller's market, with prices well above the home level, and accordingly, compared with pre-war coal, costs of Southern undertakings approximate to six times the 1939 level.

The Coal Export Differential

In this important matter of the export differential I should also tell you that in the past 12 months the most vigorous representations of which the Association is capable have been made to the National Coal Board. We sought to secure that the Southern gas undertakings should be placed on a par with Northern and British home undertakings, as to both price and other obligations, and that this position would be established for a period irrespective of the international level of prices. We believe that such an arrangement would have been equi-

able and have advantages for both sides. Unfortunately, despite agreement on general principles, we encountered difficulties which it was not possible to reconcile under present conditions. Your representatives wish to record, however, that they were met with a sincere desire on the part of the Coal Board to be helpful, and it is pleasing that a measure of agreement was reached. The undertakings concerned have been posted of the progress of these talks in more detail.

Adverse Effect on Coke Sales

It is appropriate at this point to refer to a position which has ensued adversely affecting coke sales, which also has its origin in the coal price differential and is cause for grave concern to most undertakings. Under normal pre-war conditions, coke disposal at satisfactory prices presented no difficulty, and since then and up to the end of 1952 fuel shortages created a strong market for coke. Regarding British coke, home and export demand absorbed supplies and there was little exported to Ireland during that period. In the last six months, however, the position both in Great Britain and here has changed, and British imports to this country have been reported by a number of undertakings in the South, as having been sold in the areas served by them at unduly low prices, and even below the cost at which coal can be brought to their works. Over this period there has also been accumulation of stocks by Irish undertakings generally. Prior to 1939, British gas coke, imported in some measure to supplement Irish production, was mostly handled by the gas undertakings, and thus created no unfair competition. Furthermore, coal and, therefore, coke production costs were substantially similar in both countries.

Today, due to the coal price differential, our production costs are over 50s. per ton above the cost of similar qualities in Britain. British prices for coke export, however, have regard principally to international demand for coke, which is weaker than the demand for good quality coal. The effect is that if coke at prices fixed under these conditions is freely imported here, we have no alternative but to reduce coke prices to compete, and make good the loss of revenue by increasing the already high price of gas. The importance of finding a satisfactory solution to the problem is self-evident, although some progress has been made. The step of seeking tariff protection will be taken only as a last resort.

Gas undertakings should actively encourage the domestic user of coke, in every way possible. In addition to its use in hot water boilers and modern continuous burning grates, for which it is admirably suited, it is an excellent fuel for heat storage cookers, including particularly the 'Aga,' 'Esse,' and 'Rayburn.' In fact the manufacturers of the 'Aga' cooker, I am informed, now recommend the use of coke rather than anthracite. It must be accepted, however, that for these purposes, coke must be graded to suitable size, and, where they are not already installed, coke breaking and grading machines are necessary. However, such machines are not expensive and should justify the cost to even the smallest undertakings.

Quest for Cheaper Gas

Methods to achieve cheaper gas are always in our minds, and it is axiomatic that we are continuously examining every means to secure savings and effect economies, whether in our production plants or in management. In connection with sales, we re-design tariffs, contact occupiers before they occupy new houses, promote exhibitions and sales schemes, and employ every means which appears fruitful to secure additional consumptions and so ensure maximum assistance from larger outputs. We have been successful in securing higher efficiency and in expanding the gas demand, but the influence of factors over which we have no control continues to negative our efforts.

I am not a technical man and I must be cautious, but I am increasingly drawn to the conviction that the way to lower costs is the utilisation of lower priced fuels, lower labour costs, and, where the unit is of sufficient size, development into a one-fuel industry. The usual reference to this is, of course, 'total gasification' and it is interesting that present costs of coal and labour in Southern Ireland, for making base load gas in traditional forms of coal retorts, have now risen to a point where they are in close relationship with the cost of gas made in carburetted water gas plants. Exact figures depend, of course, on the influence transport has on coal and oil costs, and on the local market for coke, but broadly a position has now arrived when it is financially sound to manufacture coal gas and water gas in proportions substantially to avoid producing coke for sale. I have not endeavoured in this proposition to refine it with questions of load factors or incidence of capital charges, etc., but it is also true that the capital cost of carburetted water gas capacity is materially cheaper to provide than that of coal gas plant.

Towards Complete Gasification

In connection with the costs of gas-making, it is pertinent to remind you that an increase of 5s. per ton in the price of coal, or a fall of 10s. per ton in the price of coke, adds a penny or more a therm to the price of gas.

In outlining this aspect of two-stage total gasification, I am aware that it provides nothing novel to the gas engineer; it does, however, show how fundamentally the economics of gas production by coal have been affected by the post-war premium placed on the value of coking coals. It illustrates why single-stage gasification in which cheap low grade fuels are used, such as in the Lurgi process, using oxygen under pressure, is now more favourably considered in Great Britain as a probable answer towards lower-priced gas. I am informed the oxygen plant is expensive but otherwise requires a low labour content to operate and is reputed to offer a gasification efficiency on total conversion of 80%. Such high efficiency cannot be secured by two-stage conversion and compares with approximately 60% in modern gasworks. Due to the associated oxygen plant, however, the units must be operated in large batteries and cannot, therefore, at present be considered suitable to our conditions. It is estimated that to secure efficient operation, a gas load of 40-50 mill. cu.ft. per day must be catered for. This would be equivalent to the aggregate daily winter demand of all Irish gas undertakings, both North and South.

Other developments which may well be of assistance, both in meeting our coke problems and finding a cheaper therm than can be produced by present methods, may be found in connection with heavy fuel oil gasification. Oil gas plants hitherto developed have suffered from limitations of thermal efficiency, to obviate which it has been necessary to utilise the lighter and more expensive fractions of mineral oil. At this meeting two of our colleagues are contributing a paper on this subject. They have already inspected a plant which appears to overcome previous objections to the use of heavy fuel oil.

Findings of the Ridley Committee

Of significance to the British fuel industry—a significance which is not without considerable interest to us—was publication of the findings of the Ridley Committee, appointed by the Minister for Fuel in Great Britain, on 'National Policy for the Use of Fuel and Power.' The stage had been set for such enquiry since the war by the placing of the three major fuel industries—coal, electricity, and gas—under State control. Much special pleading was put forward by each of the industries, but those who had hoped that a precise policy would be laid down, outlining specific circumstances in which each industry's products should be utilised, or that an over-riding authority should be set up to control the public's choice of fuel, have been disappointed. The Committee, composed, as one would expect, of men well qualified for the enquiry, reported that in principle there should be 'freedom of choice' by the consumer, as hitherto. The findings, in great detail, cover extensive references to almost every relative matter and set out the committee's views on many of the controversies with which you are familiar concerning whether gas, electricity, or solid fuel is best qualified to cater for particular loads.

The second most important finding was contained in the view that competition between fuel services should

operate under the following main conditions: 'All the prices and tariffs for fuel and power should correspond closely to the relative costs of the particular service provided. The fuel industries should not impose on consumers any conditions of supply (including the terms on which connections to new consumers are provided) which may restrict their freedom of choice and are not justified by supply costs.'

There will be general agreement in this country that the main conclusions of the report apply equally to our circumstances as to those of Great Britain. Jefferson propounded the view that the best Government is that which governs least, and this applies with greatest force where people's home lives and domestic preferences are involved. The finding of the committee that prices and tariffs should correspond closely to the relative cost of the service provided, has particular reference to two-part tariff practice as favoured by the electricity industry. We have long felt that electricity two-part tariffs are designed more as instruments of policy, on the old railway principle of charging what the traffic will bear, than to secure equitable charges between consumers. This practice has placed us as an industry in an unfavourable competitive position for certain loads which gas is better fitted to serve.

Perhaps in this the final portion of my address it is not inappropriate for me, as one who is not in daily contact with the detailed work and problems of the industry, to remark how I have been impressed with the devotion which I find exists so widely to what seems to me to be its guiding belief—namely, that consumer service is the key to the industry's long life and future happiness. I have yet to meet a gas engineer who does not accept as fundamental that the gas sent out must be of high quality and of uniform composition; that pressures must be adequate and consistent; that appliances must be attractive and trouble-free; and that staff must go more than half-way to see the consumer's point of view, to secure his goodwill. I am also impressed by the seeming miracle that, in spite of coal charges being increased up to five and six times the 1939 levels, the price of gas, in general, has risen by only about twice 1939 figures. Nevertheless, as an industry, we face a future greatly more competitive than the past, not knowing what changes it may hold either of risk or advantage. While there have been periods in our history when difficulties and sombre possibilities were greater, it would be misleading to use phrases of easy optimism. That we have the public's confidence is demonstrated by the increasing demand for our products, but the prices we now charge can allow of no inefficiency, and every project, whether of capital or revenue, must be carefully calculated to ensure no mistake.

In this last year I have learned to know the gas engineer better than before and I have observed his respect and love for his work. With these considerations in mind I have no fear for the future usefulness or prosperity of our industry.

THE ONIA-GEGI PROCESS

PAPER TO THE IRISH GAS ASSOCIATION BY

N. J. ROBERTSON, A.C.A., A.Inst.Gas E., and *H. C. HARRISON, B.Sc.(Eng.), .M.Inst.Gas E., M.Inst.F.*

Alliance and Dublin Consumers' Gas Company.

IRISH gas undertakings have not the financial resources, individually or collectively, to engage in large-scale fundamental research. We are fortunate, however, that in other countries where resources of our industry are greater, research and scientific development are well organised. Furthermore, due to the broad outlook that exists universally among gas undertakings, we are able to keep well informed of new processes or advances in techniques as they occur. In our undertaking it is the policy to encourage inspection and appraisal of any promising development likely to be of practical interest to us, and it is arising out of such a visit, for which facilities were generously granted by Gaz de France, that this paper comes to be written.

Shortage of supplies, and increases in the price of coal post war in all countries, have greatly stimulated thought and research towards possible alternative fuels or materials for gas supply. The most important of these alternatives are natural gas, refinery and liquid petroleum gases, lignites, turf, and petroleum oil.

Turf for Gas Making

We in Southern Ireland have been especially interested in any development which may further the use of turf for gas-making, for while gas coal must be imported turf is indigenous and provides local employment. Apart from an enterprise in Sweden, investigated a few years ago and found uneconomic, the only promising development relating to gasification of turf in recent years is the processing of it in oxygen under pressure by the Lurgi process. Further detailed study of possible development in this direction has yet to be made.

Of the other alternative materials petroleum oils, and particularly end refinery oil, because it is the cheapest, have warranted special attention, and considerable advances in the efficiency of using oil for gas-making can be observed over a relatively very short period of time.

Prior to the last war the main use of petroleum oil for gas-making was in connection with carburetted water gas production, and in Europe distillate oil of medium specific gravity was, and still is, the quality principally used. The contribution of oil to gas manufacture was not, however, large, as the high cost of carburetted water gas, as compared with coal gas confined its use to peak-load periods. The average cost of coal into Irish gasworks was then less than 1d. per therm, compared with gas oil at over 2d. per therm, and coke valued at approximately 1¼d. per therm net. These margins established a firm economic reason in favour of coal distillation for base-load production. Today coal into works costs over 5d. per therm in Southern Ireland, which is practically the same price as heavy fuel oil bought *ex* ship, and gas oil is approximately 7d. per therm. The relationship of these prices creates a new position in which the use of oil for base-load manufacture in lieu of coal becomes economically practicable and is likely to show advantage if the efficiency of cracking and associated costs are favourable as compared with the coal gas process.

Gasification of Heavy Oil

In the post-war period light distillate oil has been gasified with, in general, very moderate efficiency in a number of different types of plant, including existing gasworks retorts, the French G.E.I.M. plant, and former Gas Light and Coke Company's process. All these methods are continuous processes, give high specific gravity gases, and were stimulated primarily by the scarcity and price of coal supplies, but in America post-war emphasis was placed on the need to use heavier oils. Firstly, this emphasis was demonstrated by considerable technical interest towards process improvements in the separate water gas and oil-gas functions of carburetted water gas plants, with the immediate object of increasing production capacity and using residual oils. Secondly, the spectacular increase in supplies of natural gas from Western States and its rapid extension to the larger industrial cities to the East encouraged development of high calorific value stand-by and peak-load plant: and during a visit to U.S.A. plants three years ago it was observed that, where natural gas had displaced normal manufacture, conversion of carburetted water gas plants to operate purely as gasification plants based on heavy oil was general.

At this point it is appropriate to point out that heavy fuel oils differ greatly in their carbon content and in range

of calorific values. Oils above 10% Conradson carbon present many difficulties in maintaining output from carburetted water gas practice. The Hall plant manufactures carbon, blocking the base of carburettors and superheaters, and the formation of troublesome tar-water emulsions. Experience has shown that the most suitable type of heavy fuel oil for both carburetted water gas and oil-gas production should have a maximum carbon content not exceeding 6% and thermal value not less than 1.2 therms per gal. and be moderate in sulphur and ash.

Control of carbon formation and of tars in cracking petroleum oil is essential for thermal efficiency, and it has been demonstrated by research that the use of suitable catalysts with steam will enable a substantial measure of control to be secured. The recognition of this fundamental and the development of catalysts calculated to accelerate reaction, and so reduce carbon formation, has resulted in the success of three outstanding studies on this subject in recent years. These studies refer to the development of the Hall process in the U.S.A., which took place under the sponsorship of the American Gas Association, the research by Messrs. Stanier and McKean of the South Eastern Gas Board, and the development of the O.N.I.A.-G.E.G.I. process by a group of French scientists. Each of these research studies incorporated the cyclic principle familiar in carburetted water gas practice. The Hall plant manufactures gas high in specific gravity and with thermal values of approximately 1,000 B.Th.U. from heavy oils of up to 13% Conradson carbon. It is not designed to produce gas of the calorific values we require in this country and, because of the limited time at our disposal, it is not proposed to consider it further here.

The Stanier and McKean research has not so far been reported to have progressed further than the construction of the pilot plant and, although the published results were promising and are of great interest, we again do not propose to refer to it in detail.

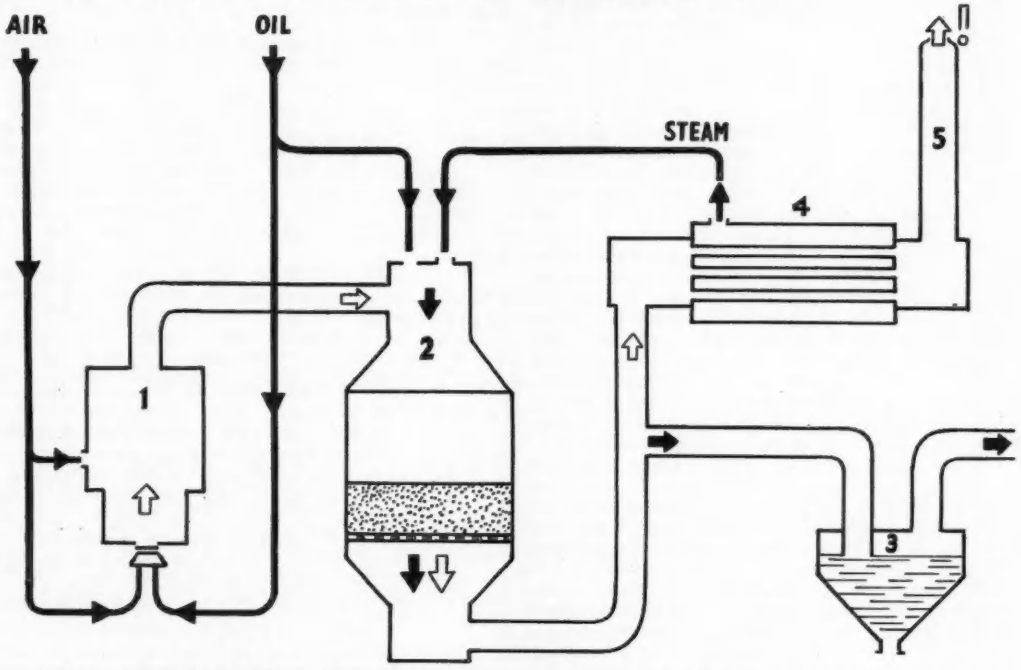
The Prototype Plant at Cahors

The O.N.I.A.-G.E.G.I. produces gas similar to coal gas and has reached an important initial stage of commercial application. It seems clearly a development of particular interest to gas undertakings in this country, and on these grounds it was selected as worthy of a visit and thereafter as the subject of this paper on oil gasification.

Immediately post-war technicians of the Research Laboratory of the Office National Industriel de l'Azote began studying the cracking of heavy oils for the manufacture of hydrogen. In trying to make hydrogen they produced a gas similar to town gas. Then tests and development of the process on an industrial scale were carried out for over a year between the Office National Industriel de l'Azote (O.N.I.A.), and the Societe de Construction d'Appareils pour Gaz a l'Eau et Gaz Industriels (G.E.G.I.), with the help and encouragement of Gaz de France.

Gaz de France has problems of rising costs and keen competition and, just as we are, is trying to lower its selling prices. Most of its bigger gasworks are capable of competing with other forms of power, but some of its smaller and even averaged sized works are less well situated. Accordingly when O.N.I.A.-G.E.G.I. offered this new technique incorporating the catalytic cracking of heavy fuel oil for the production of town gas, which gave promise of reduced production costs, it became keenly interested and decided to build a prototype plant at the Cahors undertaking, which was then working on coal but was well situated for the supply of fuel oil.

The diagram below, showing the flow of gas in the heating and conversion phases, and the points at which oil and steam enter the process, will help to elucidate the following operating explanation.



O.N.I.A.—G.E.G.I. Catalytic oil gasification plant. 1.—Combustion chamber. 2.—Catalyst chamber. 3.—Washer. 4.—Waste heat boiler. 5.—Stack. The white arrows indicate the heating circuit; black arrows indicate flow of oil, air, and steam, and the final conversion products.

The plant is housed in a light steel framed, perforated brick panelled building approximately 50 ft. long × 35 ft. wide × 20 ft. high. There is a welded steel shell combustion chamber insulated with refractory inside, mounted some 5 ft. above ground floor level and connected to the cracking chamber. The cracking chamber is also of welded steel insulated and refractory lined, on a foundation about 1 ft. 6 in. above ground level, and contains the catalyst in the base. It is connected to both the waste heat boiler and the washer. The waste heat boiler is lagged and supplies all the steam required for heating and production purposes. The washer has a conical base and is connected through a gas heater to the electrostatic detarrer. These last two units of the plant are situated in the open. The plant is equipped with positive type air blowers and an automatic operator and its meters and gauges and alarm siren are grouped in an instrument panel.

Only one attendant is required per shift and working

conditions are cool and clean. The gas output at Cahors required the plant to work only on the day shifts. It is shut down at night and started again in the morning with the minimum of time and trouble, and can be gas-making within an hour, or can be gas-making within 8 hours when started from cold. It has an output of almost 300,000 cu.ft. per day with continuous working, but the output can be reduced to 200,000 cu.ft. per day, and if it is desired to make less than this quantity the plant can be operated intermittently.

Plant Operation

The operation of the plant is similar to that of a small water gas plant though on a longer cycle of 9 min. 37 sec. duration. When the stack opens at the end of the cycle there is a small puff of black smoke, but no dust 'fliers' or nuisance of any type was observable in the vicinity of the plant. The cycle consists of two phases: a heating phase and a production phase, or, in carburetted water gas parlance, a blow and a run.

During the 4 min. 31 sec. blow, oil and air are burnt together in the combustion chamber, generating a large volume of very hot waste gas. A supply of secondary air is blown in and the oxidising gases thus produced pass through the catalyst in the cracking chamber, burning off the carbon from the oil deposited on the catalyst during the previous run. This cleans the catalyst and raises the cracking temperature in the chamber to that required for gas-making during the next run. The waste gases pass on through the waste heat boiler and out through the stack to the atmosphere. The oil and air valves are then shut and the run commences. During the 3 min. 39 sec. run, oil is injected through an atomiser at the top of the cracking chamber. At the same time steam is passed through the hot combustion chamber where it is superheated before reaching the cracking chamber. Thus a mixture of very hot atomised oil and superheated steam enters the layer of catalyst at the bottom of the cracking chamber. The catalyst accelerates the chemical reactions and the products leave the cracking chamber as crude gas which then passes through the washer and is re-heated before going through the detarrer. Leaving the detarrer the gas is treated in a naphthalene scrubber and cooler and then enters a relief holder from which it flows through the ancillary plant, is partially debenzolised, and passes to the storage holder. Towards the end of the run the oil spray is shut off about 1 min. before the steam, thus allowing steam only to pass through the catalyst to crack any traces of oil which the catalyst failed to gasify during the run. At the end of the run another blow begins and so the cycle goes on.

During the working of the plant the attendant observes and records the indications of the various meters, gauges, and pyrometers. He looks at the surface of the catalyst and the oil burner and sprayer to see if they are working properly. If the catalyst is not clean at the end of the blow, he increases the secondary air a little at the beginning of the next blow. As a precaution he changes the oil burner every shift to prevent carbon deposits eventually choking it up. The pressures in the plant range from 2 in. W.G. to 20 in. W.G. and the temperatures reach to 920°C.

The Part Played by the Catalyst

The catalyst is the essence of this plant and, although it was possible to inspect it through a sight hole during operation, it appeared only as an orange-coloured mass. No specific information was available as to its composition, but a report by Messrs. Patry, Gargominy, and Billion at the 1952 Congress of the Association Techniques de l'Industrie du Gaz de France contains some interesting references on the approach to its development. This report explained that usual catalysts, especially those having a nickel base, which is almost indispensable for obtaining even a partial conversion, in general stand up very badly to both cyclic operation and to the presence of sulphur. With regard to the cyclic operation, it is found that after several days working catalysts made without special precautions, such as those generally taken in continuous operation, lose their activity. Researches carried out in the O.N.I.A. laboratories have shown that this difficulty can be avoided by introducing appropriate foreign elements into the composition of the catalyst. Sulphur is the normal poison of nickel catalysts, and exhaustive researches have been carried out to ensure that the catalyst fixes, converts, and removes the sulphur in the oil during the manufacturing cycle.

Table I gives the characteristics of the oils used at Cahors compared with those of similar oils on the market in this country:—

TABLE I

OILS			
France		*Eire*	
Density at 15° C.	0.960-0.961	Sp. gr. at 60° F.	0.98
Viscosity Engler at 50° C.	31.3-31.6	Viscosity Redwood No. 1 at 100° F.	640 sec.
Conradson residue	9.3-9.4%	Carbon residue	10.5%
Sulphur	3.83-4.0%	Sulphur	1.5%
Pour point	20° C.	Pour point	15° F.
Water	0.0-0.15%	Water	—
Luchaire ignition point	145-147° C.	Flash point (closed)	214° F.
Asphaltes (insoluble)	2.44-2.47%	Ash	0.05%
Gross C.V. cal/kilo	10,250 approx.	Gross B.Th.U./lb.	18,700

The pumping and storage of heavy fuel oil presents no difficulties at a temperature of 80°F. at which its viscosity is 2,000 Redwood No. 1 sec. Road tankers usually deliver heavy fuel oil at or above 80°F. Heavy fuel oil can, however, reach a viscosity of 30,000 No. 1 Redwood sec. at low atmospheric temperatures and it is, therefore, necessary to provide storage tank and pipeline heating, particularly when the pipework is exposed.

Gas Analysis

Typical gas analysis in respect of the more important processes mentioned earlier in this paper are given in Table II:—

TABLE II

Plant	Hall	G.L.C.C.	G.E.I.M.	C.W.G.	C.G.	O.N.I.A. G.E.G.I.
Fuel	Fuel Oil	Gas Oil	Gas Oil	Coke Gas Oil	Coal	Fuel Oil
%						
CO_2	5.8	2.7	3.0	7.1	5.5	5.6
O_2	0.1	0.4	0.9	0.8	0.7	0.8
C_nF_m	30.5	15.3	14.0	7.7	2.1	5.2
CO	2.6	10.0	11.0	30.6	15.9	23.6
H_2	11.9	2.7	2.2	40.56	46.49	47.2
CH_4	27.4	9.8	7.4	9.08	19.71	13.0
N_2	21.7	59.1	61.5	4.16	9.60	6.6
Sp. gr.	0.91	1.00	0.94	0.62	0.51	0.47
C.V.	1,000	500	465	497	450	470

It will be noted that the oil processes, apart from the O.N.I.A.-G.E.G.I. plant, produce gases of high density compared with town gas. Their unsaturated hydrocarbons are high and their hydrogen content is low. The dissimilarity between oil gas and coal gas has up to the advent of the O.N.I.A.-G.E.G.I. process limited the amount of oil gas which could be mixed with coal gas without marked deterioration in combustion characteristics. The oil gas from O.N.I.A.-G.E.G.I. plant can be mixed in any proportion with coal gas or supplied by itself without modifications to consumers' appliances being necessary. At Cahors the plant has supplied all gas to the town since January 1, 1953.

TABLE III

Daily cost of Gas by O.N.I.A.-G.E.G.I. Process based on Plant capacity of 280,000 cu. ft. per day making 450 B.Th.U. gas

	Quantities per 1,000 cu. ft. and per therm	Rate at	Cost per 1,000 cu. ft. and per therm	
		*	d.	d.
Fuel oil No. 2	3.87 gal. 0.86 gal.	11d. gal.	42.57	9.46
Electricity	2.55 kWh. 0.57 kWh.	1.7d. unit	4.34	0.96
Water—				
(Steamraising)	4 gal.	1s. 0d. per 1,000 gal.	0.77	0.17
(Cooling)	60 gal.			
Labour	1 operator per shift estimated £3 10s. per operating day		3.00	0.67
Maintenance and repairs	Unsupported estimate		2.25	0.50
Total debits			52.93	11.76
Made tar	0.367 gal.	*No value*	—	—
Naphthalene	0.375 lb.	*do.*	—	—
Benzole	0.177 gal.	2s. 3d. per gal. (net)	4.78	1.06
		Net cost	48.15	10.70

* Road tank delivery.

The O.N.I.A.-G.E.G.I. process shows a thermal yield of approximately 62% in the gas and if the thermal values

of the tar and benzole are included it is claimed that the total thermal yield amounts to 70%-75%. No use is at present made of the tar on account of its great viscosity and its lampblack content. The designers hope, however, to consume on the plant all the crude tar produced, with further development.

The capital cost of the plant is estimated to approximate to that of carburetted water gas plant of equal capacity, or rather less than half the cost of equivalent coal gas plant. An indication of anticipated operating costs is set out in Table III, the cost of fuel oil being based on inland works taking oil supplies by road tank wagons. Where the quantities are more substantial and supplies could be taken by ocean tankers it is self-evident that the price for the fuel oil would be lower. Plants are now being built of 1 mill. cu.ft. per day capacity and should show a proportionate reduction in labour costs per therm.

This prospect of the O.N.I.A.-G.E.G.I. process appears in general to be very attractive, although the real advantages must be assessed on the facts of each individual case. Capital charges will require to be added to the above estimate of costs, but should be well below those of coal gas plants. Based on a combined interest and depreciation rate of 8% and load factor of 300 days per annum of capacity, capital charges are estimated at 1.3d. per therm, making the estimated overall production cost approximately 1s. per therm, or 4s. 6d. per 1,000 cu.ft.

In addition to its economics this plant is simple and reliable, clean and cool, and the treatment of the gas after it has left the plant has no unusual features. Assurance as to future supplies of the catalyst at a reasonable price will be necessary and future prices and availability of oil will require careful assessment, as well as similar considerations in the case of coal. To the authors, however, it appears to be a most significant advance in gasification practice.

EFFICIENCIES AND GAS SALES

PAPER TO THE IRISH GAS ASSOCIATION BY

A. L. ALLEN,

B.A., B.A.I., A.M.I.C.E.I., Assoc.Inst.Gas E., Alliance and Dublin Consumers' Gas Company.

THE promotion of gas sales depends primarily on the price at which gas can be sold in competition with other fuels, and this in turn is dependent on the efficiency of production, distribution, and utilisation. The importance of having a sound knowledge of these efficiencies is not always fully appreciated and the word itself is often loosely applied and therefore often misunderstood. It is my intention to discuss various aspects of efficiency in relation to production and distribution and to draw attention to some points which can have an important bearing on efficient utilisation.

There has always been conflict on the correct method of expressing the efficiency of production in the gas industry. It has, however, received more prominence recently, firstly on account of the Ridley Report and secondly following an especially interesting discussion at the autumn research meeting of the Institution of Gas Engineers in 1952.

Production and Distribution

One method of expressing 'production efficiency' regards the primary object of the industry to be the production of gas, and it therefore debits all the heat losses in the manufacture against the gas. The Ridley Committee adopts this method and gives the efficiency of gas production in Great Britain as being 55.6%. (If this figure is accepted it also means that for every therm of gas the industry produces at this efficiency it produces, at 100% efficiency, between one and two therms of coke.)

A second method ascertains the thermal return from carbonisation as a whole and argues that if the potential heat in the coal is converted as to 25% into gas and 50% into residuals, the total heat recovered between all products is 75% (on modern production plants this figure is somewhat higher).

A third method proportions the heat loss between gas and residuals on the basis of their thermal content; and as gas only accounts for about one-third of the heat recovered from coal, only one-third of the heat lost in the process should be debited against it. The efficiency in relation to gas by this method is around 80%.

It is not proposed to devote further time to these methods of computation or their relative merits, but for general discussion the important point is that the gas industry is able to recover between 75% and 80% of the potential heat in the raw material it uses. When coal is used for the generation of electricity, the thermal efficiency of production is no more than 25%.

The efficiency of gas distribution was stated by the Ridley Report as 90.3%. This figure, based on the assumption that gas distribution efficiency is equal to the gas sold to consumers divided by the sum of the gas produced and the gas purchased for resale, including in the latter the thermal equivalent of the electricity consumed in distribution, does not do full justice to the industry unless one has a fuller understanding of the circumstances of the apparent loss of 9.7%.

Firstly there is always a discrepancy between the amount of gas issued, as recorded on the works meter, and the amount of gas sold, as recorded on the consumers' meter, due to the gas being measured under different physical conditions. Corrections made for temperature and pressure differences between the works and consumers' meters are accepted only as an approximate correction to interpret average conditions. This inaccuracy in measuring volume together with condensation in mains and services, leakages, and faulty meters, is responsible for what is normally called 'unaccounted-for gas.' This gas should by no means be considered as lost, as the consumer gets the benefit of the greater proportion of it on account of meters reading slow, unregistered gas, and the fact that the Gas Acts allow meters to read 3% in favour of the consumer and 2% in favour of the gas undertaking. The only gas actually lost is that which leaks from the system. This may normally be accepted as amounting to less than 1% and it is likely that this figure will be reduced as the extent of district mains with flexible rubber joints increases. A small loss of energy occurs in overcoming the friction of the mains and services, but this will not exceed 0.25% except where a large proportion of medium and high pressure gas is distributed.

The total thermal losses in distribution may, therefore, be put as approximately 1.25%. Hence the total number of therms actually received by the consumer is substantially the same as that issued from the works.

Production and distribution efficiencies combined gives the proportion of the original energy processed and transported or secured at consumers' premises, and if the values are taken as 75% and 98% respectively, the combined efficiency is 73.5%. This is substantially greater than the impression given by the Ridley Report—that the process is only 48.4% efficient in this respect.

Utilisation Efficiency

It is not proposed to deal with all the pre-requisites for the efficient utilisation of gas, but brief reference will be made to some of them. Attention is usually paid to calorific value, but in my experience sufficient importance is not always attached to specific gravity, although it is an important factor governing the discharge of jets and injectors.

All modern gas appliances give their best performances when operating at the B.Th.U. rates and gas pressures

for which they are designed. This means that jets and injectors should be suited to the characteristics of the gas with which they are to operate, and appliance manufacturers are now more generally adopting the use of the Wobbe Number method of classification, which makes due allowances for the specific gravity of the gas as well as the calorific value. The B.Th.U. rating of an injector at a particular pressure is directly proportional to the calorific value divided by the square root of specific gravity, which is the Wobbe Number. For the purpose of selecting jets and injectors towns gas is classified according to its Wobbe Number into the following six groups:—

Wobbe Number	Injector or Burner Group
Over 760	G.3
701-760	G.4
641-700	G.5
591-640	G.6
531-590	G.7
Below 531	G.8

Injectors are sometimes marked with a number in addition to the group number and this indicates the consumption of the jet in thousands of B.Th.U. per hour. For example, a jet to pass 10,000 B.Th.U. of gas having a calorific value of 450 B.Th.U. per cu.ft. and a specific gravity of 0.53 would be marked 10.G.6.

Importance of Uniform Pressures

The heat passed through any injector or jet in a given time, as well as being directly proportional to the Wobbe Number, is proportional to the square root of the pressure. It is therefore important to keep the pressure uniform in the mains and if possible between 4 in. and 5 in. W.G. should be maintained. This is often difficult in the case of large new building sites developed a distance from the centre of distribution, and in my Company on occasions plans for supplementing outlying districts, as for instance with medium and high pressure feeder mains, have to be delayed due to lack of information regarding the extent of future building developments.

The general public is not always aware of the advances which have been made in modern gas appliances and do not realise that they now conform to scientific standards. Unless employees of the industry who are in contact with the public are fully aware of the advances being made, the thinking behind them, and also have some specific technical knowledge, they will not be in a position to correct these wrong impressions. Of the wide range of appliances on the market, those produced by reputable manufacturers conform to British Standard Specifications Nos. 717, 1250 and 1344. B.S.S. No. 717 deals with combustion, and specifies that the ratio of the volume of carbon monoxide to carbon dioxide in flue gases, should not exceed 0.02 at any heat input rate between the minimum operational rate and an overload rate of 20% for governed appliances, and 40% for ungoverned appliances.

B.S.S. No. 1250 gives certain specific detail requirements, and standard methods of testing various appliances.

B.S.S. No. 1344 gives methods of testing vitreous enamel finishes.

Watson House Service

Most manufacturers in Great Britain submit their products to the industry for testing, and the reports which are subsequently issued are of great value in assessing the quality of appliances. In the case of my Company we are permitted to be contributory members of the Watson House service and no appliance is handled prior to a satisfactory report being received. In addition, however, it is always advisable for individual gas companies to carry out their own tests, particularly in regard to the construction being suitable to local conditions and ease of maintenance. In spite of all these precautions faults still show up under district conditions, and a system of inspecting new types of appliances for a period under actual working conditions is strongly advocated.

The gas industry in Ireland has no very serious competition from local merchants in the sale of gas appliances, and while this has some self-evident disadvantages they are more than outweighed on technical grounds insofar as undertakings thereby have fairly effective control over the type of appliances and also the standard of fitting work on the district.

While domestic cooking accounts for a large percentage of the gas consumed, it is only proposed to deal with one or two points which may be of interest. It is usually estimated that about 80 therms per annum are required to cook for the average family of four, and over three-quarters of this is consumed on the hotplate. It is therefore disappointing to note that the present efficiency of boiling burners, when using standard vessels of 7 in. and 8 in. diam., is limited to about 50%. The use of finned-bottom kettles can increase this figure by about 5%, but it seems to me that a higher efficiency at this point should form the subject of special research study. It is appreciated that appearance, ease of maintenance, reliability, etc., must be taken into consideration in the design of all appliances, but it would appear that there has been insufficient attention paid generally to thermal efficiency, but rather that it has been neglected in favour of these other factors. In many cases the operational efficiency of hotplate burners is reduced considerably by the consumer who prefers to leave the gas lit between cooking operations rather than re-ignite it, and it seems regrettable that it is not yet standard practice for reliable ignition devices, operable merely by turning on the gas cock, to be fitted to all new cookers.

Space heating offers a valuable field for the use of gas, and considerable improvements and advances in efficiency have been made. Neat flame burners in the modern types of gas fire make them silent in operation, give better turn-down without danger of lighting back, and eliminate all difficulties with choked burners and injectors, thus reducing maintenance considerably. Such fires have a general overall efficiency of about 50% which is increased to 55% when fitted in specially fabricated units. The modern convector fire is designed to give more convected heat without reducing the radiant heat and have an overall efficiency of 60%, of which some 50%, is radiant and 10% convected heat.

Flueless Heating and Sulphur

Flueless heaters naturally have the highest thermal efficiency, approximating to 90%, the apparent loss of 10% being due to the fact that use cannot be made of the latent heat of the water vapour formed during combustion. Their use, however, requires very careful consideration to avoid condensation and the smell of sulphur oxides. These troubles do not occur if the gas rate is related to the size of the room and the ventilation is adequate. Normally the consumption of 10 cu.ft. of gas per hour per 1,000 cu.ft. of room space will provide ample heating. If 1½ to 2 air changes occur per hour it should be possible to keep the dew-point of the atmosphere below the temperature of the coldest surface in the room and thus avoid condensation.

Difficulties with smell from sulphur oxide can be avoided if the gas rate is limited to V divided by 15. S cu.ft. per hour, where V is the volume of ventilating air in cu.ft. per hour and S is the sulphur content of the gas in grains per 100 cu.ft. It was suggested by the Hayworth Committee, reporting to the Minister of Fuel and Power on the Gas Industry in 1945, that town gas should not exceed 10 grains of sulphur per 100 cu.ft. This limit would increase the scope of flueless heaters and also reduce the maintenance on all appliances considerably.

A simple general rule for the continuous use of flueless heaters permits the gas consumption to be 1 cu.ft. per hour per 100 cu.ft. of space if there is a flue or air-brick of 20 sq. in. in the room, but if the air-brick opens on to a landing, about twice this area will be required. For intermittent heating 1 cu.ft. per hour per 50 cu.ft. of space can be used under the same conditions. The standard requirement of approved flueless heaters is that the CO to CO_2 ratio shall not exceed 0.02 when the apparatus is in operation in a room the air of which contains up to 2% carbon dioxide, with corresponding nitrogen increase and oxygen defficiency. The percentage of carbon dioxide present in the air of a room of volume V cu.ft., in which the number of air changes per hour is N, is given by the formula: $C - Ca = \frac{100.U}{VN}(1-e\ )$ where

C = carbon dioxide present in the air at an interval of T

hours after lighting the gas.
Ca = carbon dioxide present in the air entering the room. (This is normally less than 0.05% and for our purpose can be neglected.).
U = volume in cu.ft. of carbon dioxide produced per hour by the gas consumed. (Normally this is about half the volume of the gas consumed).
The quantity e^{-NT} decreases rapidly as T increases and when T is large it can be ignored. For general purposes the formula can therefore be written:—$C = \frac{100\ U}{VN}$ and from this it can be seen that the percentage of carbon dioxide will never exceed 2% when the gas rate is 1 cu.ft. per hour per 100 cu.ft. of space and the air change is as low as one-quarter per hour. Consequently testing appliances in an atmosphere containing 2% carbon dioxide represents conditions of air vitiation much more severe than any likely to be met with in practice. In cases which are not suitable for heating solely with flueless heaters an efficiency of 75% can be achieved by using either a balanced flue heater or by supplying half the required heat with a convector fire and the other half with flueless heaters.

Degree Days

We sometimes receive complaints that an installation which we believed to be efficient is using more fuel than was anticipated, although the temperature is maintained at a steady figure either by manual or thermostatic control. This is often due to the fact that those concerned do not fully appreciate that for a few degrees increase in room temperature there is a large increase in fuel consumption. As the total number of B.Th.U. required per annum for continuous heating is equal to $H \times 24 \times D$, where H is the total hourly heat loss in B.Th.U. per degree difference between inside and outside temperatures and D is the appropriate number of 'degree days,' the total annual heat requirement for a particular room is directly proportional to the number of 'degree days.' Table I shows the number of 'degree days' in Dublin for three different base temperatures.

TABLE I

Month	Average Mean Outside air temp.	Number of days in Month	Base temp. 50°		Base temp. 55°		Base temp. 60°	
			Temp. diff.	Degree days	Temp. diff.	Degree days	Temp. diff.	Degree days
January ..	42.7	31	7.3	226	12.3	381	17.3	536
February ..	42.6	28	7.4	207	12.4	347	17.4	487
March ..	43.9	31	6.1	189	11.1	343	16.1	499
April	47.1	30	2.9	87	7.9	237	12.9	387
May	52.9	31	—	—	2.1	65	7.1	220
June	57.5	30	—	—	—	—	2.5	75
July	60.5	31	—	—	—	—	—	—
August ..	59.6	31	—	—	—	—	0.4	12
September ..	56.0	30	—	—	—	—	4.0	120
October ..	50.9	31	—	—	4.1	127	9.1	282
November ..	45.1	30	4.9	147	9.9	297	14.9	447
December ..	43.2	31	6.8	211	11.8	366	16.8	521
Total number of Degree Days ..				1,067		2,163		3,586

From Table 1 the annual heat requirements for a room temperature of 65° (base temperature 60°) is proportional to 3,586. For a room temperature of 60° (base temperature 55°) it is proportional to 2,163, and for a room temperature of 55° (base temperature 50°) it is proportional to 1,067, which means that to raise the room temperature from 55° to 60° for the whole heating season will require an increase of $\frac{(2,163 - 1,067)}{1,067} \times 100 = 103\%$ in fuel consumption, and from 60° to 65° will require an increase of $\frac{(3,586 - 2,163)}{2,163} \times 100 = 66\%$.

The Water Heating Load

Domestic hot water can be supplied by a variety of appliances and whether they be of the instantaneous or storage types they have an appliance efficiency of about 75%. With this efficiency they could in theory meet the average weekly hot water demand of a family of two adults and two children (about 150 gal. of water at 140°F.) for a consumption of 1.5 therms, but in practice up to twice this figure is normally required. In the case of instantaneous heaters it is mainly due to the hot water left in the pipes after each draw-off together with some tepid water which must be drawn off before the appliance has fully heated. With storage heaters and circulators the extra gas used is attributable to heat losses from the system. In general the least expensive arrangement of a domestic hot water system by gas is to use a circulator or a large instantaneous heater for baths, and a sink heater for smaller quantities. With storage systems the use of economy valves and divided storage will also effect considerable savings.

The necessity of keeping constant gas pressure to all appliances is a primary rule for efficient performance, but this is particularly important with instantaneous water heaters. Here a pressure variation of plus or minus 25% may be responsible for water temperature rises varying from 55° to 90°F., depending on the variation between the pressure for which the appliance has been adjusted and that pressure at which it is operating.

A plus or minus 10% variation in Wobbe Number can have practically the same effect as the 25% variation in pressure already mentioned.

The many advantages of instantaneous water heaters are well known, but they could be greatly improved by the addition of thermostatic control to overcome variations of inlet water temperatures. This would make adjustment of the water flow must less critical. Such a control would also increase the appliance efficiency if it was designed to reduce the tepid water to be drawn off before the water obtains full temperature.

Influence of Coke Sales

The revenue from the sale of coke has an all important bearing on the price at which gas can be sold and it is therefore essential to actively develop coke sales. Coke is too often regarded as 'something left over from the manufacture of gas' rather than a refined fuel. In fact, the efficiency of an appliance burning coke is between 5% and 10% greater than when the same appliance is burning coal.

The accepted public preference for an open fire in living rooms has led to the development of a finned-back boiler grate which has an overall efficiency of 60%, of which 25% represents radiant output and 35% hot water. This grate, which is specially designed for burning coke, should be a useful addition to the existing range of appliances. A specially designed gas attachment with an efficiency of about 60% is provided for summer hot water heating. The grate has a deepening bar, slow combustion attachment, and air control on the ashpit which makes it possible to control the rate of combustion and permit overnight burning. To achieve the maximum efficiency with modern coke fires a flue area of only about 20 sq. in. is necessary to clear the products of combustion. If the flue area is greater than this a removable type of restrictor plate should be fitted, which is designed to increase the efficiency by reducing the number of air changes in the room.

Ours is an old established industry which, while retaining all that is best of the past, has kept abreast of modern scientific development. Full advantage cannot, however, be taken of these developments unless all our staffs, particularly sales people, are conversant with the simpler technical considerations.

BOILER HOUSE PRACTICE

J N. WILLIAMS, author of *Steam Generation*, which was recommended by the City and Guilds of London Institute, has produced a work some three times the length of the earlier publication which will be of great value to engineering executives, practical steam engineers and students, especially those taking courses in boiler-house practice and combustion engineering. It is entitled *Boiler House Practice* (60s., George Allen & Unwin, Ltd., Ruskin House, Museum Street, London, W.C.1), and comprises 600 pages. The author explains in a preface that he wrote *Steam Generation* when the paper shortage was most acute, and his treatment of several subjects was therefore somewhat cursory. *Boiler House Practice*, however, covers its subject much more adequately.

GAS PRODUCTIVITY TEAM

WALES AND MONMOUTHSHIRE DISCUSSION ON REPORT OPENED BY

E. M. EDWARDS,

Member, Wales Gas Board.

MR. E. M. EDWARDS, Member of the Wales Gas Board and a member of the Gas Industry Productivity Team which visited the United States in 1952, introduced a discussion on the report of the team at the annual meeting of the Wales and Monmouthshire Section of the Institution of Gas Engineers at Carmarthen on September 10.

In his introduction Mr. Edwards said: It is important to keep in mind the economic background of gas supplies in the United States, where 95% of the gas provided is natural gas. The sales of gas are four times those of 1934, and the average gas price only 5% above pre-war. The general type of functional organisation is accompanied by clearly defined responsibility and authority. A close study of the methods and economics of American combination utilities would appear to be worth while.

The wide use of budgetary control and statistical methods, and especially the promptitude with which figures are made available for the use of management, are particularly important. Speed in the preparation of such information was greatly stressed—quite rightly.

Natural Gas

American conditions of gas supply, where such large quantities of natural gas are transmitted for distances up to 2,500 miles, are greatly different from those in this country. Nevertheless, certain features of experience in the U.S.A. may be of value in the determination of the future development of gas supply in Great Britain, particularly if the large scale explorations sponsored by the Gas Council are successful in locating gas fields in this country. Included in particular points of interest are specifications for pipelines and ancillaries operating at pressures up to about 800 lb. per sq. in., mainlaying techniques, design of compressor stations, gas turbines for compressor operation, gas conditioning—dehydration, dust removal, odorants, oil fogging and humidification.

The development of underground storage of gas in disused gas wells and in suitable geological strata is interesting and important, and it would be worth while examining the possibility of such developments being introduced in Great Britain if geological surveys prove encouraging.

The methods developed in the U.S.A. for the reforming and utilisation of natural gas will prove of assistance to us in the developments now taking place in connection with the utilisation of methane from coal mines.

The existing known reserves of natural gas are equivalent to about 25 years availability. During the next 50 years supplies will apparently decline, and the search for alternative and economic methods of gas production is one of the main problems confronting the American gas industry. The development of such alternative methods of gas production should prove of great interest to Great Britain.

Liquefied Petroleum Gas

More than 300,000 consumers in the United States are supplied with L.P. gas, either undiluted or mixed with air. The process is soundly established in the United States, but it is new to Great Britain, where the first pilot plants have only recently been introduced. It has a particular application in Great Britain in meeting the needs of small towns and rural communities. The expansion now taking place in the oil refinery industry in this country should result in a large increase in the availability of L.P. gases. The use of these gases by the gas industry presents potentialities, and can make a useful contribution to coal economy. Large L.P. gas plants are used extensively by gas undertakings in the United States for meeting peak load demands. The introduction of this process in Great Britain will depend especially upon the terms of purchase for the fuel.

Standard codes of practice should be prepared covering the design, installation and operation of L.P. gas plants, and special regard should be paid to fire and explosion hazards with transport and storage plants.

Gas Manufacture and Distribution

The report refers to the limited extent to which coal gas is now manufactured, and this takes place only in coke ovens, where coal selection and preparation, and refractory life, are worthy of study.

Methods of increasing the effective outputs of C.W.G. plants, by operating at much higher blast pressures, and the use of oil in generators and carburettors, are of particular interest as providing means of increasing the capacity of existing plants, with attendant advantages. These developments are now being explored for one of our works.

The oil gas processes producing gas of 1,000 B.Th.U. per cu.ft., which are being extensively introduced in the U.S.A., are not at present of such general interest in this country. The recent developments in Europe of processes for the production of town gas in the region of 450 B.Th.U. per cu.ft. by the cyclic catalytic cracking of fuel oil, to produce gas interchangeable with ordinary town gas, is of fundamental importance to us in this country.

In Great Britain, while mechanisation of works processes has received great attention, there is room for greater use of machines for distribution work, not only for long distance pipe lines but also for main and service laying on large housing schemes. The use of narrow trenching machines leads to economies.

Included in interesting features of distribution practice are: methods of steel pipe protection and the great attention paid to minimising corrosion, operating pressures of high pressure pipe lines, the use of orifice meters for large supplies, methods of testing mains for soundness, and the considerable use of short wave radio. The regular rotational method of conducting leakage surveys, which is common practice in the U.S.A., is a pointer to us.

The use of residual high pressures for avoiding the need of recompression at holder stations can be of value in gas grid areas. We hope soon to have in operation our first 'jet booster' installation.

The technique of replacing services by drawing copper tubes through the old services, or through the hole created by the old service, has a practical application here, and we have ordered our first set of equipment for this purpose.

Limited Holder Storage

Of particular importance is the American practice of operating with very limited holder storage, or no orthodox storage at all. Some 78% of the gas distributed does not pass through gasholders. Above six hours storage on the maximum day is regarded as very high. Reliance is usually placed upon underground storage, line packing, and peak load plants of various types. We could well consider the extension of the practice of providing peak load plants of minimum capital cost, especially where they are only required for short periods, instead of investing large capital sums in gasholders.

Flexibility is also attained in some instances by means of interruptible supply contracts to large consumers who have alternative fuel sources. This could have an application to conditions in Wales, especially during the summer and weekend periods.

The combination of production plant flexibility and consumer demand flexibility has resulted in long distance transmission systems being operated at a very high load factor. It leads to the thought that in this country, in some instances, there is a case for the examination of the operation of long distance gas grids for base load purposes, and for peak loads to be met by specially

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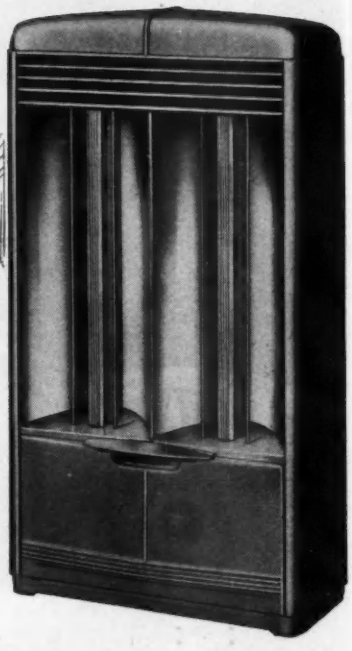

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designed peak load plants producing an interchangeable gas at selected points along the line or at the extremities.

The American outlook on appliance sales is quite different from ours. The general policy is to encourage consumers to change their appliances at relatively short intervals, as new developments are introduced. Automatic ignition by means of electrical accessories is general and popular. The development of whole house heating on a very extensive sale is largely attributable to the availability of low priced natural gas. At present we have no comparable conditions here. The large scale development of the domestic water heating load, principally using storage heaters, is noticeable, and of prime importance.

About 53% of the total quantity of gas sold in the U.S.A. is used for industrial purposes. Low prices and American methods of selling gas during off-peak periods are important factors. The extensive use of 'Package' equipment, and of light steel construction instead of cast iron for industrial and commercial purposes, were particularly noticeable.

No Prepayment Meters

There are no prepayment meters used. Credit accounts are usually monthly, but there is a tendency to change to a two-monthly basis. Mechanised accounting is universal, speed being the criterion, not necessarily cost.

The actual sale of appliances to consumers is largely in the hands of dealers, supported by the sales and technical services of the gas company. Some executives consider the industry is unwise in relying so much upon the activities of dealers. There is in Great Britain, however, a strong case for extending dealer co-operation, as supplementary to, but not in substitution for, the sales, service, and showroom activities of gas undertakings. Promotional publicity, home service, and free consumer service are cardinal points in U.S.A. sales development methods.

The extent to which the basic principles underlying gas tariff construction have been applied in the U.S.A., and the use of such tariffs as instruments of competition and sales promotion will repay careful study. It will be noted that tariffs generally are almost all on the block system, with the first blocks as a minimum charge.

In the field of industrial relations it will be seen that the American method of annual contractual negotiation is quite different from the joint negotiating machinery soundly established in Great Britain. The absence of incentive schemes for payment by results, with the exception of payment of commission to salesmen, was general in the gas industry in the U.S.A. The training, supervision and safety of employees were viewed as of great importance, although the approach to the problems involved was different from our practice.

Training for Management

The attention paid to training for management is in advance of that here, but the American gas industry could find interest in the national schemes of training and examination in other subjects practised in Great Britain.

The liberal and many-sided attack upon research problems, including those of interchangeability of fuel gases, oil gasification, production of peak load gas, high pressure gasification of high ash content fine coals, oxygen production, and underground gasification, embraces investigations of great interest.

Unless the report leads to action it is of limited value, and its implementation must be for those who are engaged in the operation of the industry. In this connection I quote the following from the 'Policy and Programme of the British Productivity Council':

'By virtue of their position as leaders, we believe that a special responsibility falls upon all ranks of managers and supervisors, whether they be engaged in industry, in the trade unions, in the fields of education, politics or the civil service. All exert a real influence, directly or indirectly, on the efficiency of industry and the climate in which it works. By their work and decisions they have to ensure advance on the technical side of production and distribution. They have also to secure the understanding and enthusiasm of those for whom they are responsible, if real progress is to be made.

'In the short term, experience has shown that a marked advance in productivity can often be made with existing equipment by improvements in methods of control and/or minor changes in layout, etc. This demands a fearless and critical examination of present methods of working and of organisation. It requires a willingness on the part of both management and workers to make, and accept, changes that will serve the common purpose. We wish to stress our belief in the need for this approach and in the benefits which would result to all concerned.

'In the long term, higher productivity must come mainly from continual improvement and extension of the physical means of production and distribution. This demands the application of technical knowledge derived from research. It depends equally on the provision of capital for new equipment, which can come only from savings. Savings can only be the difference between consumption and production. So if the rate of production is increased the less the need to reduce consumption.

'It is not sufficient to understand and accept the fact that "as we produce, so can we live." It is for everyone, whatever his position or job may be, to increase the effectiveness of his own work by every possible means. Only if this is done can our present economic difficulties be overcome, so that all may receive the benefit of improved living standards and of true security.'

Mr. Edwards added that Mr. A. G. Higgins, who was also a member of the team, did a tremendous amount of work as its Joint Secretary, and he welcomed the opportunity of paying tribute to him.

MR. HIGGINS' IMPRESSIONS

Mr. A. G. Higgins, Assistant Secretary of the Institution of Gas Engineers, drew attention to the section of the report dealing with 'combination utilities' and said the team were rather hesitant in making any formal recommendation because conditions in the United States were quite different from those in this country. There appeared, however, to be a case for looking further into the combination utilities of America. There were large companies of the size of some of our area boards, concerned with both electricity and gas, and in that connection he drew attention to a further remarkable document that had just been issued—the report of a Productivity Team which had studied problems of fuel conservation—a team which was just leaving America when the gas team arrived.

The Fuel Conservation report was courageous and outspoken—in fact it was a sort of super Ridley Report—and it gave a lot of views on fuel conservation in this country. It referred specifically to the further study of these joint utility companies in America and suggested methods whereby the electricity and gas industries in this country might collaborate with a view to fuel saving. He merely drew attention to the report and suggested that members might find it well worth reading.

On the question of refractory materials for coke ovens there was no doubt that conditions in the coke ovens in the United States were extremely good. That was probably due largely to their very careful selection of coals, and also partly due to the use of a small moveable wall in the test oven. If they were changing conditions or type of coal, before doing so they carried out experiments with the moving wall, which gave them optimum conditions of working. These factors played a large part in the question of life of refractories, and the team felt it would be a good idea to look into the question of American silica.

Interruptible Supplies

Reference had been made to interruptible supplies and their contribution to flexibility, but the thing that would limit the application of the system in this country was the large difference in price. In America it was possible to offer such attractive price conditions as compared with other fuels as to make it well worth while for the consumer. He did not think the price difference would be sufficient in this country for the scheme to become attractive to industrialists.

Mr. Edwards had referred to a shock which the team had when it went to the A.G.A. on the question of sales

and service. The American outlook on selling was entirely different from ours. The chief salesman of the A.G.A. told them that the main line of approach was the creation of dissatisfaction, and went on to give them examples of how the salesman started by making a housewife dissatisfied and proceeded to interview the husband, asking him whether he thought his wife was worth 20 dollars. The Americans produced the most wonderful looking cookers with clocks and knobs all over the place, but they were not supposed to last more than 10 years. The whole idea was to keep up the sale of new appliances. In many instances a certain proportion of the weekly wage or monthly salary was allocated to hire-purchase of all kinds of things, and as soon as the consumer finished paying for one thing he started on something else. On the whole he thought it was possible to sell appliances in the United States a great deal more easily than in this country.

Whole House Heating

There had been development of whole house heating on an extensive scale; indeed, the only time they came across queues in America was in connection with whole house heating. There was reference in the utilisation section of the report to gas fitters, who were mostly provided with cars in which they carried so many accessories that it was only necessary to do a minimum amount of gas fitting on the job. Nearly all of their work was merely connecting up.

On the question of education he had been rather concerned. Some four years ago they started in the Institution of Gas Engineers to compile data concerning the education and training schemes of all the member countries of the International Gas Union, for which purpose they prepared a questionnaire. They used their own system as the basis for preparing the questionnaire and they found that it did not apply to America because the individual companies there mostly set up their own training schemes. They found that those schemes varied enormously as between one and another. During the visit he had asked whether they considered it would be advantageous to have a national scheme for gas fitters or gas engineers or any other group of people, and in most cases they said they thought it would. The team had made one recommendation in this connection to which he suggested the members might give some attention.

DISCUSSION

Dr. A. B. Badger, Industrial Relations Officer, Gas Council, said that on the question of industrial relations the report made it quite clear that in the United States they were dealing with an entirely different problem. They had an enormous country with enormous distances which in fact made it quite impracticable to have a centre dealing with all the aspects of industrial relations throughout the country or to conclude national agreements which would be applicable to the various States. They also had such a wide variety of companies. The Americans had not got that homogeneity that we had in the gas industry even before vesting date, when about a third of all our undertakings belonged to local authorities. In the States the main reason for the absence of national agreements was geographical. Personally he was not very enamoured of the American method of contractual negotiation. He did not think it was an admirable system at all, and it was not one that would be suitable for this country. They had a rigid contract which neither party could or did vary except in very unusual circumstances until it expired. Human beings were not like that and should not be tied down to a rigid contract of that kind. It might be true to say that in the factory itself they had very good results where they called people by their Christian names, but generally he did not think we had a great deal to learn from the United States in these matters.

The references to incentive bonus schemes were interesting. There again he thought it was a case of the Americans learning by painful experience in a short time the sort of lessons which we in this country had learnt over a large number of years. Incentive bonus schemes, to be successful, must be intelligible to the men concerned. Most of their schemes were so complicated and the way their wages were calculated were such that they were unintelligible to the average working man.

We had a great deal to learn from America with regard to safety. In this country we had regulations covering safety on works. In the United States they had not got anything like the complicated regulations that we had; on the other hand they impressed upon their workers a sense of individual responsibility more than we did—a responsibility for their own safety. The worker was thrown back on his own common sense when he dealt with dangerous machinery, and he thought the ideal would be a combination of their practice and ours. He did not think we ought to scrap our various Acts but he did think there was a great deal of education necessary for the British working man in order that he might himself assume a very large responsibility for not getting into unnecessary trouble with the machinery with which he was concerned. He had read through the section of the report dealing with industrial relations and his conclusion was that we had a lot to learn from the United States, but they had still far more to learn from us in those respects.

Trade Union Movement

Mr. Edwards agreed that the background was very different in America. The area covered was so great that in fact it was equivalent to many countries welded together into one. They also had so many different types of people. They had, for instance, a colour problem, and to get a national structure would be very difficult. So far as the gas industry was concerned we had not much to learn from American standards of industrial relations—but we had *some* things to learn. In broad perspective the United States trade union movement did not appear to have developed to anything like the extent it had in this country. As time passed and the movement developed he was sure they would encounter some of the problems that we had met and overcome. There were some aspects that were good, and especially this—that when an employee was engaged, no matter what his job was, he was properly trained so that he could carry out the job reasonably and efficiently. Particularly, he was instructed in safety. The man's foreman was made responsible for seeing that the man was trained in safety. There was rather more attention paid to the training of employees from the safety angle. The general attitude of management and men seemed quite free and easy, but it was an attitude that had been developed on rather different lines from those in this country. It would be a long time before they could develop a national structure or national organising machinery such as we had in this country, but in time he thought there would be some form of organisation, though not national.

Mr. W. K. Hutchison, Vice-President of the Institution of Gas Engineers and Chairman of the South Eastern Gas Board, said the point that had impressed him more than any other was the statement that the existing known reserves of natural gas in America were equivalent to about 25 years availability, and that supplies would apparently decline during the next 50 years. Yet this gas was being used at a high rate, and he wondered whether it would not be proper to suggest that its use should be confined to those purposes for which it was ideally suited, and that it should not be used in place of oil. If it were stored and kept against future use it might last 100 years instead of 50. Had the Americans yet come to any realisation of the throwing away of this fuel? The only comfort he could find in that connection was the most interesting development about 30 years ago of the vertical organisation, the Koppers Co., with the Mellon Institute behind it. They had the idea of developing coke ovens near the mines from which the coal was produced and building plants which would feed gas into the utilities—Boston, for example, was going to be on the grid. They pictured their organisation as taking full responsibility for the fuel of the country. The American Federal law, however, broke down that project. Eight years ago, when he was in the States, they were still actively developing the coke market and plans were being made for the supply of enormous quantities of gas. In the past eight years the whole thing had gone, and they had seen the natural gas industry built right up. Would it not be more profitable in the long run to continue the carbonising industry?

Prodigal Use of Resources

Mr. Edwards said Mr. Hutchison had raised an important point. The United States was a rich and prosperous country with vast natural resources. But timber, for instance, was being cut down faster than it was being replanted. And the Americans were fortunate in the availability of thick beds of coal near the surface, their hydro-electric power, their oil resources, and their gas. The Federal State authorities were now taking action to restrict the use of natural gas to purposes for which it offered particular advantages. In some districts already restrictions were being placed on the supply of increased quantities of natural gas. The real answer was that thinking Americans, and those responsible in large measure for the future of the gas industry, were paying particular attention to the point which Mr. Hutchison had raised.

It was a very real one, and it seemed quite wrong to use valuable fuel for purposes which might equally well be served by other fuels.

Until two years ago discovery of additional natural gas fields each year exceeded the increase in the output of gas over the previous year, but a state of affairs was now developing in which the increase in the sale of natural gas was greater than the discovery of new fields. Twenty-five to 50 years life was very short, and at present one of the points insisted upon by the Federal authorities was that no new natural gas line should be laid unless there was a guaranteed supply of natural gas for at least 20 years. The trend of legislation was to exercise much greater control over the uses to which natural gas was to be put in the future.

A More Recent Visit

Mr. W. T. Hird, Distribution Engineer, Wales Gas Board, said that as a member of a European team he had had the great good fortune of seeing American conditions as recently as the spring of this year. The point Mr. Hutchison raised had now been very much realised in America. So far as he could gather the reason for the growth of the 'interruptible load contract' was that the transmission companies wanted a high load factor and decided to adopt a maximum demand charge. The whole house heating schemes would lead to a much greater demand for gas in the winter than in the summer. The question of beginning to reduce what the companies regarded as wasteful interruptible consumption was very live in the United States now.

He had been very interested in references to multiple companies, because the picture was a very peculiar one, and rather paradoxical. In practically none of the largest of the big cities had the gas companies merged into a single city gas company. It was possible for a gas company to merge with an electricity company, but they had not merged into one gas company. In the result they got multiple companies supplying gas and electricity, and on the other hand they got a multiplicity of companies supplying gas. The American picture generally was a rather confused one.

One comment he would make was how careful they had to be in applying lessons learnt in America, as reported so frequently in the American Press and as they found from visits to America. The European team of which he was a member, rather differently from the gas team, worked in a very restricted field, and they began to be alarmed at the very different answers they obtained. The picture was changing so rapidly that they were not absolutely agreed on the answers to many technical questions, and he thought they needed to be careful in taking what they read in the Press and in considering some of the recommendations in the report, to make sure that they were in fact going to apply in their own individual cases.

He could not help feeling that attempting to apply American practice in this country would be rather like looking at an object through the wrong end of a pair of binoculars. One valuable lesson could be learnt from their mental approach to a technical problem. It was very impressive to see how they seemed to be able to get on with their major work. There was the story of the laying of the trans-Continental pipeline of 1,800 miles of 30 in. pipe—started in 1949, and finished in 1951—which was about the time it would take us to get the pipe ordered in this country.

Finally, he would like to say what an excellent piece of work the report was, and how well it would repay the closest study.

No Merger of Gas Companies

Mr. Higgins suggested that Mr. Hird's references to the non-merging of gas companies might be misunderstood. Although there might be three gas companies in any particular city, they had their own areas of supply. There was no competition as between one gas company and another in any city. In Philadelphia they had a gas company in the centre of the city, an electricity company supplying the whole of the city and gas only in the suburbs; so the electricity company completely surrounded the gas company. The position, however, was not so complicated in practice. He was glad Mr. Hird had mentioned the question of concentration of technical effort on a problem. It was a matter which had impressed him very much; they would get a whole team of experts together very promptly. They really did go ahead very rationally and did not worry about scrapping plant. Mr. Hutchison had raised a point about the prodigal use of fuel. They found this was worrying the research people very much. Dr. Hall, of the A.G.A., and the Institute of Gas Technology, were worried because they could foresee the time—perhaps in 25 or 50 years, which was a very short time in the life of an industry—when they would be trying to cater for a tremendous load with nothing to replace the exhausted supplies of natural gas. They were working on long-term problems of total gasification, underground gasification, and other projects. All that research work really deserved a visit of its own.

Mr. Edwards said one of the most striking things about the gas industry in the United States was the attitude of mind and the readiness to accept changes, and that applied, so far as he could see, from the chairmen of the companies right down to the operatives. Some doubt had been expressed in connection with interruptible supplies as to whether there would be sufficient price difference to make the system workable in this country. In the summer period coke oven gas and refinery gas in some instances was bled to waste. It was in the true national interest that that gas should be used, even if no one made anything out of it.

Mr. J. H. Chapman, Senior Vice-Chairman, referred to the use of an automatic valve on a gas grid, which closed when the pressure dropped suddenly. He could see the advantages of such an arrangement in this country. No matter how well a grid was maintained there were certain dangers whereby the main could be fractured, and with a grid running through built-up areas the virtues of such valves could be of great value. Had Mr. Edwards any views about their being incorporated in a gas grid in this country?

Tendency Towards Greater Pressures

The report stated that in America the consumer received gas at pressures up to 11 in. W.G., and the tendency was still further to increase the pressure and to fit governors at the inlet of the meters. He wondered why we could not do something on those lines in this country, particularly in view of the heavy costs of mainlaying today. In the past the practice had been to supply gas at a very low pressure. It was realised that the whole of a town could not receive the benefit of improved mainlaying immediately, but it would come in due course, and he would like to know Mr. Edwards's views with regard to an examination of the situation to see if the time was ripe or suitable for pressures to be increased. The cost of mainlaying was very high, and if they could double the pressure at which they delivered gas to the consumer they could put up the quantity supplied by 50%. There would, of course, be a question of unaccounted-for gas, but the higher pressure would only be for short periods.

He was surprised to learn that the Americans had no fixed positions for their services in roadways or side walks, but he noticed that in most places kerb cocks were fitted at the instigation of the fire departments. At one time in this country we fixed pavement cocks of the old plug type, but the trouble was that they could never find them when they wanted them. Was this a refinement that we could afford to do without? Probably one of the most attractive features of American practice was the advancement in mechanisation. Many of their expensive and elaborate machines were only suitable for big schemes, but some of the smaller machines would surely be of value in this country—particularly some of the small trenchers, concrete cutting machines, and augers for underground drilling. Were the American machines suitable for importation into this country? They would be expensive and they would have to be fully employed, but he thought full value could be obtained from some of them.

Another point of interest concerned the use of plastic tubes. If they could be used here in place of steel tubes there would be an immense saving of time as a result of dispensing with screwing, threading, and jointing.

Mr. Edwards reminded Mr. Chapman that the report was a joint effort of all members of the team, and Mr. Higgins had played a major part in its preparation. Referring to automatic valves for long distance transmission, he had discussed the matter with Mr. Hird, and they agreed that they fulfilled a very real need in the United States. Whether such valves had a place in our own schemes was another question; the answer was yes, certainly, for long distance lines, but the extent to which they could be applied on shorter lines was a matter they would have to look into more closely.

Cutting off Supplies

He agreed with Mr. Chapman as to the desirability of considering delivering gas at higher pressures and fitting governors on consumers' meter inlets. We must do this especially where schemes were under consideration for replacing existing mains. He thought we should with advantage be able to adopt the same scheme. There was no standard position for the services, and each company had its own arrangement, which differed between one town and another. There were certain factors in the United States which rendered it necessary to employ cocks in footpaths or side walks, a matter which had not been generally practised in this country. The main reason was the great and growing use of tenements or flats. They were building upwards rather than outwards, with resultant increase in the danger of fires. Another point was that there were few if any prepayment

meters; they were all ordinary meters, and the cocks were useful for cutting off supplies in cases where consumers failed to pay their accounts. Very many American housewives were working in the day time and it was difficult to gain access to their homes.

There was a need to develop in this country the use of small machines for main and service laying work, especially those capable of cutting narrow trenches for the mains and services for housing schemes. For our conditions we should have to develop suitable machines. The standard of labour in the United States was an important factor. There was no distinction there between the black coated and the manual worker. Their holidays and hours of work were the same, and it was standard policy to mechanise everything as far as possible in order to make sure that they attracted the right type of men. Considerable care would be necessary in connection with the application of plastic tubes, which so far as he knew were not, in all cases, suitable for manufactured gas. Their comparative softness also rendered them liable to damage by other workers when used in roadways.

Plastic Service Pipes

Mr. Hird said he found plastic services had been laid in parts of New Jersey, but they were not very happy about them. They were about to put in some plastic tubes for pulling through old services, but their whole attitude was one of great wariness. He was in touch with the New Jersey people and they were going to keep him posted with regard to developments.

On the question of automatic cut off valves, the American mains on which they were used were passing enormous quantities of gas at very high pressures. If there was a line breakage the pressure was so high that even if there was only a small orifice they got a tremendous drop in pressure, and it was assumed that the valves were operated in such cases. There was a great deal of experimental work to be done. As to the extent to which such valves could be made available they must wait and see. The Americans had at least half a dozen trench digging machines of the type we wanted in this country—4 in., 6 in., and 8 in. We wanted machines of that type, highly mobile and sturdy. We should not get very far until we had imported one or two, and that matter was receiving attention.

Mr. Higgins said that at the Engineering and Marine Exhibition at Olympia some plastic tubes were shown which were claimed to be quite suitable for gas. Mr. Haynes, President of the Institution of Gas Engineers, was making arrangements to try them out at Bournemouth. The tubes were similar to those seen in America; lorries had been driven over them several times without any apparent effect on the tubes.

Mr. S. L. Wright (Wales Gas Board) said that at an early stage of the report reference was made to the rapid growth of supplies of natural gas in America, which now accounted for 95% of the thermal gas sales of the American gas industry. A typical analysis of the gas was given, showing a methane content of 91% and a calorific value of 1,047 B.Th.U. per cu.ft. Mention was made of the need to adjust or modify appliances when consumers were changed over from manufactured gas to natural gas.

Liquefied petroleum gas was the most recently developed of the major domestic, commercial, and industrial fuels. It was being used undiluted at calorific values ranging from 2,520 to 3,270 B.Th.U. per cu.ft., mixed with air at calorific values from 525 to 1,600 B.Th.U. per cu.ft., or reformed, chiefly for dilution of natural gas. Manufactured gas was drawn from coke ovens or made in water gas plants, a large proportion of which were used for the treatment of natural gas or for the gasification of oil only.

Wide Variety of Gases

The requirement of meeting satisfactorily and economically the varying demands of summer and winter loads, coupled with Governmental control over the rate of use of natural gas, had resulted in the modern American gasworks manufacturing, producing, or using some combination of the following gases, either as a regular operation or for supplementing winter supply or for emergency purposes:

Natural gas, 1,000 to 1,100 B.Th.U.
Coke oven gas.
Carburetted water gas.
Oil gas, 1,000 to 1,050 B.Th.U.
Producer gas.
Oil refinery gas, 1,800 B.Th.U.
L.P. gases, 2,520 to 3,270 B.Th.U.
Reformed oil refinery gas.
Reformed natural gas.
Natural gas/air mixtures.
Reformed L.P. gas.
L.P. gas/air mixtures.

The choice of the combination used for district gas supply was governed by several factors, one of the most important being interchangeability, which was defined as the possibility of using a substitute gas or gases for that usually distributed to the consumer without interfering with the operation of the appliances he used. Interchangeability was affected by characteristics of the individual gases, such as calorific value, specific gravity, and composition, and the report emphasised that unless knowledge and care were applied to the mixing of the gases the operation of appliances could be dangerously affected by flame lift, flash-back, and yellow tip production.

In Wales they had not had such a wide diversity of gases to call upon, but American experience might well be a magnification of a problem that did exist in Wales without its being fully realised. Those who were or had been responsible for the maintenance of public lighting using finely adjusted burners for securing maximum efficiency knew the evidence of changing composition that was provided by black tipped or blown off mantles when unregulated mixtures of coal gas and water gas were employed. Modern industrial practice frequently called for heating flames of exact and constant size and heat emission, and for the maintenance of prepared atmospheres for heat treatment work. Demands of that nature had recently emphasised the problem in the case of certain of the Wales Gas Board's own undertakings.

Varied Developments

One of the main trends of development in the general use of gas in industry in America was the greater use of controlled and prepared atmospheres for many classes of heat treatment work when normally such atmospheres were not considered absolutely essential. Since vesting date there had been several developments in Wales leading to variations in gas composition which were not previously experienced over so wide an area. Among these developments were:

Interlinking of gas supplies from new and obsolescent coke ovens in the eastern section of the South Wales grid.
Similar interlinking of coke ovens in the western section of the South Wales grid, with the emergency use of L.P. gas enrichment to supplement gas from one particularly obolescent coke oven plant.
Elimination of some coal gas plants in both eastern and western sections of the grid, but the retention of carburetted water gas for emergency and peak load requirements.
In the case of undertakings using continuous vertical retorts the dilution with producer gas as an alternative to steaming the retorts:
In the case of undertakings using horizontal retorts the substitution of producer gas for blue water gas as a diluent.
The general control of gas quality and calorific value by increased calorific value of carburetted water gas diluted with producer gas.
The emergency use of L.P. gases in conjunction with producer gas or other diluent.

To that list future developments would see added the expansion of the use of L.P. gas; methane from mines; and oil refinery gases.

The question of interchangeability was not therefore new to the gas industry in Wales, and it would be of interest if Mr. Edwards could enlarge on the references made in the report to the treatment of that matter in America.

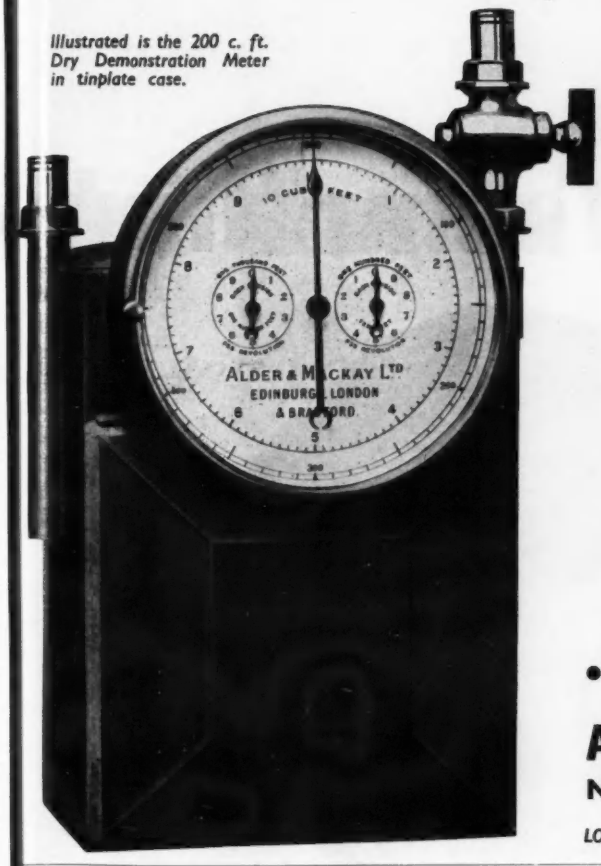
Interchangeability of Gases

Reference was made to their endeavours to produce formulæ for determination of interchangeability of gases, but it appeared that practical test burners were the real guide. The use of such burners indicated that they relied on something similar to our A.T.B. Number or its equivalent for reference purposes rather than use the Wobbe Index. He submitted that we should persevere in our efforts to compile daily records of A.T.B. numbers, confirming any variations encountered by reference to calorific value and specific gravity.

Mr. Edwards said interchangeability was looked upon as of primary importance in the United States, and a mass of information had been issued as the result of investigations carried out in the testing laboratories of the American Gas Association. There was an extreme case at Portland, Oregon, where they had oil gas of 570 B.Th.U. through a long distance main. At the extremities during periods of peak load they added a propane/air mixture of 1,000 B.Th.U. The gases were in fact interchangeable provided the quantity added was not much in excess of 20%. It was a case of giving therms away but the Company considered it was better to give therms away for short periods than to lay another long main. There were so much data on the subject that it was difficult to attempt

(*Continued on p. 784*)

Illustrated is the 200 c. ft. Dry Demonstration Meter in tinplate case.



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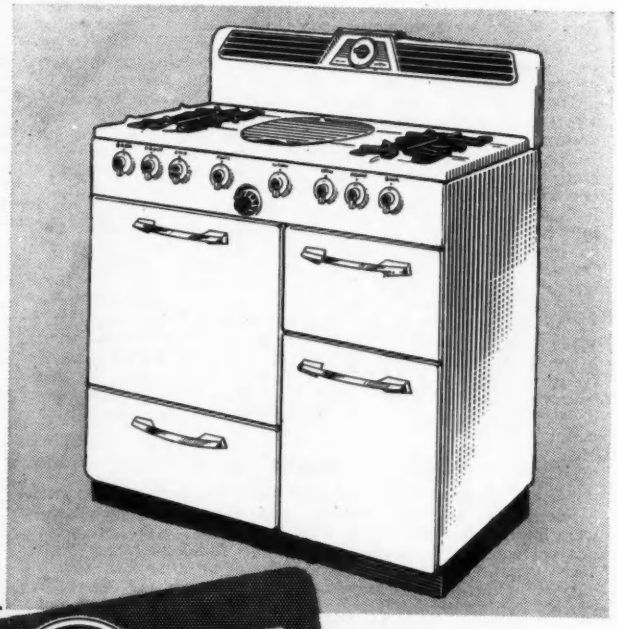

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to answer the question briefly. Use was made of mathematical formulæ and various forms of test burners, but when all was said and done the final test was on the appliance itself, and in the testing rooms he had seen set up gas cookers, water heaters, and other appliances. On a cooker with four burners on the hotplate, two would be set for hard flames and two for soft flames, and the men who carried out the tests knew from experience what the shape of the flame should be.

Dealers' Responsibilities

Mr. E. Ablett (Swansea) said he found it difficult to strike a balance between the various statements regarding sales promotion. They were told that the Americans had a very intensive sales policy, and at the same time they were told that they sought to create consumer dissatisfaction. It appeared that the policy was to encourage the consumer to change his appliances very frequently. The appliances normally had a very short life, and the sale of appliances was largely in the hands of dealers. Their hire purchase policy was, he supposed, the responsibility of the dealers. He took it that the dealers dealt also with the fixing, because it appeared that fitters in the gas industry were trained for maintenance, and not for installation work.

Mr. J. H. Daniels (Milford Haven) expressed surprise that there were no automatic gas valves available in this country. There were valves for water which, he thought, might be adapted with advantage for use with gas. He confessed that he had found little practical help in the report; he had found much more of interest in Graham Hutton's new book, 'We Too Can Prosper.' The report to a large extent was of no practical significance to him as a manager. He had looked at it critically to see how much he could do and how much he might apply, and he was left with the impression that it did not convey an awful lot. He had learnt more from many of the other productivity reports. The one striking thing about all the reports was simply that the Americans knew how to manage a lot better than we did.

Mr. A. Pickard (Llanelly) said he wondered whether all the statements in the report were realistic, or whether some of them were American propaganda. An American who addressed a meeting at Swansea recently said the British workman compared quite favourably with his American counterpart. There were, however, some differences. The physique of the American workman was generally superior to that of our own, and therefore his capacity for sustained effort was greater. The increasing mechanisation in the American industry, and the use of machine tools, was having a marked effect on production. In the executive branches there appeared to be much more competition and there was no let up in the quest for efficiency. One could not be dogmatic about the management courses because one particular course might not be necessarily the right one for a particular individual who sought to bring his own personal qualities into his job. Most of the management courses sought not so much to teach technical subjects which they could get from books but to encourage the formation of groups in which individuals could instruct each other out of their personal experiences. It was not so much a question of providing lecturers but of learning rather than being taught.

He was interested to hear Dr. Badger say that we had little or nothing to learn from America in the matter of industrial relations. We had a longer background in this country, and the trade union movement in America was developing as a result of their study of circumstances in this country.

Need for Mechanisation

Mr. A. H. Dyer (Newport) said there was such a difference between American undertakings and ours that comparisons were impossible. He agreed with Mr. Chapman that we were not yet sufficiently mechanised, but he could not agree with his suggestion that we should have ultra-narrow trench diggers. One of the secrets of good mainlaying was the correct cutting of the trench, and if the foundation was not sound there was a distinct possibility of fracture at a later date. Most of our mains were now being laid in verges and there was always the danger of a settlement of the ground if ultra-narrow trenches were employed.

He had been struck by the references in the report to the testing of meters. There was no general standard in the United States for the testing of meters, and where any standard was applicable it ranged over plus or minus 4% which appeared to him to permit of a terrific amount of unaccounted-for gas. We had adopted a much more rigid standard, provided we looked after our mains and services. Meters were the chief cause of unaccounted-for, and it was surprising that a country of the magnitude of the United States had no real standard for testing meters. There was reference in the report to 10,000 meters per annum being repaired by 10 men, which worked out at two hours per meter. He defied anyone to repair a meter in that time.

He also entertained some doubt about the threading of copper or plastic through existing service pipe. He agreed that the cost of renewing services was very high. We had services here which were not very large, and now came the suggestion to do something which would decrease rather than enlarge the size of the service. That appeared to be a rather retrograde step. Reading the whole report it seemed that the secret of the success of the American gas industry had been the development of natural gas.

The Age of Appliances

Mr. Edwards, dealing with Mr. Ablett's remarks on sales policies, explained that there was a national sales policy developed by the American Gas Association, but the individual companies ran their own showrooms and had their own home service advisers and did their own advertising and publicity. The dealers' activities in this connection were supplementary to those of the gas companies. It was very difficult to draw the line between the national and company campaigns. The dealers had a very wide measure of responsibility themselves for developing sales campaigns in their own interests. In America an appliance 10 years old was looked upon as being really out of date, and the attitude of the companies was that it ought to be replaced long before that time.

Mr. Higgins pointed out that the Gas Appliance Manufacturers' Association—known as Gama for short—was closely affiliated to the American Gas Association. It would be seen in the section of the report dealing with education and training that the gas companies provided courses of instruction for the Gama people.

Mr. Edwards said the rates charged for gas had to be approved by the State Commission. The companies were not free to charge what they liked. If they wished to make a reduction in rates or tariffs it might take up to two years to get the change approved. It was general practice to sell gas at one price for most purposes, but there were exceptions, for which special rates were introduced.

Mr. Higgins said in practice there was usually one range of prices for various purposes under the heading of domestic rates, and another range of prices for various purposes under the heading of industrial rates.

Mr. Edwards told Mr. Daniels that he was reading the book to which he had referred, and was finding it interesting. Only Mr. Daniels could determine whether or not the report was of practical significance to him. He could not agree with the generalisation that the Americans knew how to manage a lot better than we do. His opinion was that the best in this country are quite as good as the best in America, and our task was to lift up the standards as a whole. There were many features of American practice that were of particular interest to us, in the same way as there were many features of British practice of interest to those in the United States.

Two-Way Traffic in Ideas

The visit, he further explained, was really a two-way matter, and although there was much in the report about what the team learnt, there was relatively nothing about the information which the members of the team imparted to their American colleagues.

They must realise that America was a country that was rich in natural reserves; it was a country that had been expanding in population by some 5% to 7% per annum. It had wonderful opportunities for creating its own markets as it went along.

He quite agreed with Mr. Dyer concerning the care that was necessary in dealing with narrow trenches, but pointed out that every cubic yard cost money to take out and put back and every effort must be made to reduce costs as far as practicable. The repair of 10,000 meters by 10 men was not so incredible as it might seem. It had to be remembered that there were no prepayment meters in the States and that the repair shops were very highly mechanised. He referred to various features such as the use of induction heaters for stripping meters, and the handling of meters on the conveyor principle.

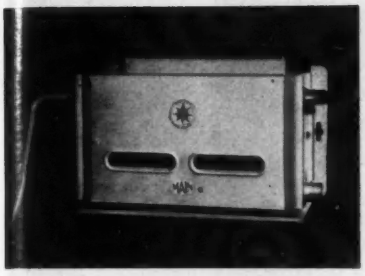
A vote of thanks was accorded to Mr. Edwards on the proposition of **Mr. Ablett,** seconded by **Mr. G. Fitton** (Neath).

Mr. Edwards, responding, said if in America it paid to transmit gas over distances up to 2,500 miles, it should be possible for the nations of Europe and of the rest of the world to get together and make their vast surplus quantities of natural gas available to their neighbours. Tremendous quantities of gas were being wasted. It would be an illuminating exercise to take a compass and set it to 2,500 miles and see how far the world's rich gas and oilfields could extend their supplies. It was an international problem with international complications.

New Appliances on Hire

THE Northern Gas Board is to offer to its consumers on simple hire terms, an instantaneous sink water heater, fitted ready for use in their homes, together with the choice of two modern gas fires in coloured finishes. The hiring facilities are of course a continuation of hiring arrangements which were in existence before the war.

The new 'Northern' sink water heater has been specially designed in the Board's laboratory to meet the needs of thousands of homes where the sole means of providing hot water for domestic purposes is by a kettle on the hotplate of the gas cooker.



The new 'Northern' water heater.

The basic consideration of design was the production of a low-priced heater at approximately half the cost of current sink water heaters, in order to introduce gas water heating to a hitherto unexplored market. This new appliance takes a horizontal form, 10¾ in. long × 5½ in. wide × 7½ in. high, and is of neat appearance and of robust construction, particular attention being paid to ease of installation and maintenance.

The gas fires offered on hire are the three-unit 'Camelot' and a Radiation model of the 'Silent Beam' type, choice of four colour finishes being available.

I.H.V.E. Examinations

THE next examinations of the Institution of Heating and Ventilating Engineers will be held in April and May, 1954 (Section A, April 5 to 9; Section B, May 20, 21 and 22). Candidates who have already submitted proposal forms for membership and have been accepted as examination candidates must submit an examination application form (obtainable from the Secretary) before February 28, 1954 (January 31 for overseas candidates).

Candidates who have not previously made application should submit proposal forms for membership not later than December 31. Students and Graduates of the Institution are not required to submit a transfer application form, as they are permitted to enter for the appropriate section of the Associate Membership Examination (A or B) on completion of an examination application form.

A revised scale of examination fees has been introduced. From January 1, 1954, any candidate wishing to claim exemption from any portion of the Associate Membership Examination will be required to pay £1 1s. registration fee with the membership proposal form. Candidates who submit proposal forms before December 31 and claim exemption will not be required to pay this fee, but should such candidates subsequently apply for further exemptions the registration fee would then be payable.

Scottish Western Juniors

THE first meeting of the Scottish Junior Gas Association (Western District) for the session 1953-54, was held at the Royal Technical College, Glasgow, on September 11. Mr. A. McInnes (Dumbarton) occupied the chair and accompanying him on the platform were Mr. Alex. Walker, President, and Mr. W. A. Green, Hon. Secretary.

Opening the meeting, Mr. McInnes explained that his presence in the chair was due to the fact that the immediate past-President, Mr. R. A. Currie, was unable to attend. In Mr. Currie's absence Mr. McInnes welcomed those present and called for their full support during Mr. Walker's year of office.

Introducing the new President, Mr. A. McInnes expressed his hopes that the session would prove successful. Mr. Walker was then invested with the President's medallion, after which he proceeded to present his Presidential Address. (This will be published subsequently in the *Gas Journal*.)

Mr. G. Royden (Vice-President) congratulating Mr. Walker, said how pleased he was that the man on the inside of the gasworks was getting to know the problems of the man on the outside—namely, the men engaged on gas distribution.

Mr. J. Greig (Dawsholm), who wished Mr. Walker a successful term of office, added that, in Glasgow, some mains which were laid about 60 years ago were found to be adequate today even though the loading had changed considerably. He suggested that this was good planning on the part of those who were responsible in the first instance.

Mr. W. A. Green (Paisley) also complimented Mr. Walker on his address. Regarding mainlaying, Mr. Green agreed that this had received secondary consideration. Hence the serious predicament in which they found themselves today. This applied also to internal gas fitting where the majority of the pipes were of ¼ in. and ½ in. diam., this work having been performed by plumbers many years ago. Mr. Green explained the system of supply at Paisley, which comprised low and high pressure mains, as well as feeder mains. High-pressure ring mains with governors placed at strategic points kept the area adequately supplied with a steady pressure. Wrapping of pipes, he added, could be a complete waste of time and money if the elementary precaution of drying the pipe was not complied with—and non-compliance was quite common in many undertakings.

Mr. Walker, replying, made the point that the exchange of opinion between manufacture and distribution personnel should be encouraged, because they were both aiming at a common purpose—consumer service.

Mr. W. Cummings, in proposing a vote of thanks to Mr. Walker, stated that the members had selected him because of his work for the Association and of the interest which he had always shown. He hoped that his term of office would be a happy one.

PROABD (England), Ltd., have changed their address to 76, Victoria Street, London, S.W.1 (telephone TATe Gallery 3311).

IRISH GAS ASSOCIATION—(Continued from p. 767)

Mr. J. C. HEYLIN, President of the Waterford Chamber of Commerce, said he was expected to say something about the City of Waterford; and he wished to couple the Waterford Gas Company with his remarks, as the Corporation and the Gas Company were linked together and dependent on each other. In the last 10 years they had increased industrial production to a remarkable extent—in no small way due to the fact that they had an efficient and up-to-date gas undertaking. If there was to be further development of the gas industry in Ireland, he thought it should be allied to the peat industry.

Mr. F. J. CASSIN, Chairman, Waterford Harbour Commissioners, said the relationship between the Waterford Gas Company and the Waterford Harbour Board was very cordial. The people of Waterford had long memories and remembered the wonderful service that was given to them by the Gas Company during World War II, when the production of gas was 'more than a nightmare.'

Principal Guests

Major G. ANDERSON, Director, Waterford Gas Company, proposing the toast 'Kindred Association and Our Guests,' said they were delighted to have the delegates with them in Waterford.

Mr. JOHN T. HAYNES, President of the Institution of Gas Engineers, replying, said they had elected to the high office of President the most efficient worker the industry had in Ireland. It was of prime importance, and he appreciated the wonderful way in which the small gas undertakings in Ireland were facing up to their difficulties. They were privileged to have Irish colleagues sitting on the Council of the Institution of Gas Engineers in London, and while the geographical position made travel awkward, they should encourage their representatives to attend those meetings regularly, not only to keep in touch with what they in England were doing, but because it gave the Irish representatives an opportunity of having a say in the manner in which the Institution conducted its affairs.

Sir JOHN STEPHENSON, Chairman of the Eastern Gas Board, remarked that it had been a real privilege for him to attend the conference and dinner. He had been afforded the opportunity of meeting new friends and renewing old acquaintances.

The toast of 'The Press' was proposed by Mr. F. K. THOMAS (Limerick) and replied to by Mr. CLIFFORD KING, Managing Director of the *Gas Journal*.

Mr. F. S. CLEGG proposed the toast of 'The Ladies.'

The Outings

On the Wednesday afternoon many of the members and ladies made an interesting tour of the Waterford Glass Works. On the Thursday there was a coach outing, touring west along the South Waterford coast and turning inland through South Tipperary and the Knockmealdown Mountains. After lunch at the Cahir House Hotel the tour was continued through the Glen of Aherlow, the Galtee Mountains, and the Blackwater Valley to Lismore. The golf competition was played on the Clonmel course nearby, and the two parties rejoined for an evening meal at the Lismore Hotel, Lismore.

Gas at Sunderland Crematorium

THE Industrial Gas Development Committee has released a report (No. 528/52) based on information provided by the Sunderland Undertaking of the Northern Gas Board relating to the gas installation at Sunderland Crematorium. The crematorium was the 59th to be established in the country and the first to be sanctioned and completed since the end of the war. It was opened on November 1, 1951, by Lord Horder, President of the British Cremation Society, and the first cremation took place in the last week of that month. Only one furnace was installed initially, but a second of the same type has since been fitted.

The furnace was supplied by John F. Askam, Birmingham, and the front view is shown in Fig. 1. It is fired by six gas-and-air blast burners arranged three on each side on separate manifolds. A Keith Blackman motor driven blower supplies air at a pressure of 8 to 10 in. w.g. giving approximately 6 in. w.g. at the burners. A governor is fitted in the gas supply set to give a working pressure of 3 in. w.g., with all the burners in operation, and at this pressure the full-on consumption is 3,000 cu.ft. per hour. As is common practice in such equipment, this figure is of value as a guide to the total capacity and the size of main fitted. In practice it is rare that more than half the burners would be required at any one time, six being provided so that individual burners can be lit as required. The burners are provided with individual level gas cocks and graduated plates, with a single air control valve to each manifold.

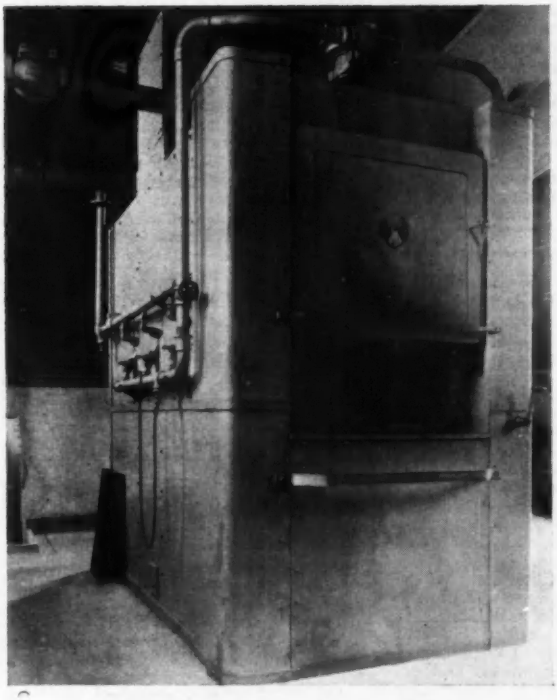


Fig. 1.—Front view of the Askam furnace.

A feature of the burner design is the separation of the air supply into two streams within the burner head. Partial gas-and-air mixing takes place in the burner throat, and an additional air supply is carried forward through an inner central tube to mix at the nozzle. Well aerated flames and good oxidising conditions in the chamber are thus ensured.

The furnace chamber is 7 ft. 6 in. long by 2 ft. 8 in. wide by 2 ft. 6 in. to the crown, and the burners fire downwards at a slight angle on to the coffin. The furnace is provided with a rising counter balanced door at the front with concealed mechanism, and hinged doors at the rear. The products of combustion of the gas pass below the hearth at the rear and return under the hearth to the centre. They are then carried again to the rear via side ports and rise up internal flues at the rear corners to be gathered into the main flue, which is fitted with an adjustable damper.

The coffin rests on steel rails on the hearth, which is solid except for an 18 in. long grid through which the remains fall or are raked into the lower compartment.

An additional air supply to promote oxidation and eliminate smoke, prevalent in the early stages of cremation, is introduced through ports in the top of the furnace chamber. This airstream is pre-heated after passing through the main flue off-take.

Fig. 2.—The main flue off-take.

Since the opening cremations have taken place at an average rate of 60 per month. With the one furnace, it was found possible to handle up to seven cremations per day.

Gas consumption for a first cremation has varied from six to 12 therms, depending upon the number of cremations on the previous day. It is found, however, that although the six burners have a maximum full-on consumption of 3,000 cu.ft., or 15 therms per hour, a first cremation can normally be completed in 1¼ hours with only two burners in operation, *i.e.*, a gas rate of 1,000 cu.ft. per hour. The average time for subsequent cremations after the first is 35 minutes.

Average consumption figures are given in the table below, together with individual consumptions for three typical days in January, February and April respectively.

Month, 1952	No. of cremations	Total gas consumption cu. ft.	Average per cremation	
			cu. ft.	therms
January	60	73,500	1,225	5.88
February	59	64,600	1,090	5.23
March	58	67,100	1,150	5.52
April	56	64,700	1,155	5.54

TYPICAL DAILY CONSUMPTIONS

	cu. ft.	therms	cu. ft.	therms	cu. ft.	therms
1st cremation	2,400	11.5	1,800	8.64	1,500	7.2
2nd ,, ...	1,200	5.76	1,300	6.24	900	4.3
3rd ,, ...	600	2.88	900	4.32	1,200	5.7
4th ,, ...	Nil	Nil	1,100	5.28	400	1.9
5th ,, ...	Nil	Nil	800	3.84	600	2.8
6th ,, ...	Nil	Nil	600	2.88	Nil	Nil
Average	700	3.36	1,080	5.18	920	4.4

The calorific value of the gas supply is 480 B.Th.U. per cu.ft., and gas on the ordinary tariff costs an equivalent net rate of approximately 10d. per therm.

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GAS APPLIANCE MANUFACTURERS

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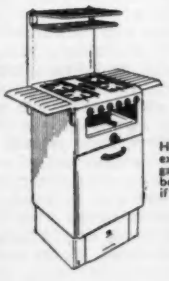
No. 20

CENTURY

GAS COOKER

The Century combines efficiency with pleasing appearance, is particularly easy to clean, having vitreous enamelled surfaces throughout—exterior finished in cream . . . The roomy oven gives a high quality cooking performance with a minimum gas consumption, and the whole of the oven space is available for cooking—the base being especially suitable for slow cooking . . . Special oven features include Mainstat heat control, flash-tube lighting to burner, easy-clean rounded corners and drop-type door . . . Used oven heat vented in front of backplate and warms double-shelf plate-rack . . . The hotplate has four burners—all can be used for fast boiling *or* simmering—and a large griller. Hotplate fittings are removable.



Hotplate side extensions and gas pistol can be supplied if required.

NOTE THE NAME—MADE BY MAIN

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South Western Public Relations Policy

'PROFOUND dissatisfaction' with the public relations policy of the South Western Gas Board was expressed in a resolution passed by the Consultative Council at Taunton on September 9. Members protested against the Board's decision not to appoint a public relations officer and decided to ask what alternative step the Board proposes to take to improve the position. Mr. A. W. Loveys, Taunton (chairman) presided.

At its June meeting the Council resolved that in the interests of consumers and with the object of maintaining the present price of gas, the Board should consider appointing a public relations officer to ensure that the story of gas received full publicity. But the Board replied that it considered the present arrangement of employing a publicity officer in each division was adequate.

Mr. L. G. Northcroft (Cheltenham) said that in his area they did not even know of the existence of a publicity officer. He thought that what was lacking was a person to interpret the Gas Board to the public. From time to time the Board had to make decisions on tariffs, meter rents, and so on, and in the past there had been criticisms of the way the Board's point of view had been put to the public. He suggested that until there was liaison between the Board, the Press and the public that situation would continue. 'The Board speaks its own language, but it is not the language of the Press or public,' he declared.

'Extremely Remote'

Mr. L. N. Deeley (Crewkerne) said the general public as a whole felt that these boards, national and regional, were something extremely remote. 'People refer to them as "the Board," but sometimes not in quite such polite terms' he commented. 'I think we want something more down to earth that will reach the ordinary members of the public.'

Mr. H. T. Bush (Cheltenham) said he did not know who the publicity officer was in North Gloucestershire. Possibly he drafted the advertisements for the local Press.

Miss J. Stephen, Bristol (deputy chairman) said one former officer had complained that he was merely a copy writer.

Mr. H. Morland (Glastonbury) said the Area Board had done a wonderful job in the integration of services, from which they all benefited, but the public knew nothing about it. A public relations officer would be somebody of rather more stature than a person dealing with advertisements.

The Chairman said he had put the Council's case very strongly before the Board and possibly the reiteration of their views might wear away the Board's opposition. He added that the main object of integration was economy. Public relations policy was something far wider than publicity.

Mr. W. E. Baggs (chief accountancy assistant to the Board) said he thought the Board was handling publicity, such as window displays and selling campaigns, quite adequately. When the Board had something special to say the Chairman often had a Press conference, and, moreover, it looked to local contacts to see to public relations rather than to a man who might be remote from the public. The Board felt that locally there were adequate contacts with the Press and were trying to maintain them.

Mr. H. Morland said that a number of small undertakings in the leather industry were spending £50,000 a year to publicise the use of leather. It was a co-operative effort. In his opinion, the Gas Board were not putting adequately before the public the work it was doing and that weakness could be remedied by the right man. Mr. Deeley added although the local people did their best in their own areas, they were not expert publicity agents.

Mr. Northcroft thought that publicity in the electricity industry was infinitely better than for the Gas Board. 'One gets the feeling that there is a smug satisfaction from being good technicians, which relieves them of any need to publicise their wares,' he said.

The decision of Chard Corporation to ask applicants for their houses whether they preferred gas or electricity for cooking was welcomed. The Secretary (Mr. A. A. Murrell) said he wrote informing the Town Clerk of Chard that the local committee of the Consultative Council was told that Council house tenants were not free to exercise a choice between gas and electricity. This the local committee very much deplored. A reply was received that the Corporation had never heard of any local feeling in the matter one way or the other nor had there been any complaints from tenants. It had since been decided to send a questionnaire to applicants on the housing list, enquiring whether they preferred gas or electricity for cooking if allocated a house. The committee would be kept informed of the result of the questionnaire.

Mrs. E. J. Exelby (Redruth) said Chard was the first council she had heard of taking such a sensible step. She knew of people who preferred gas, but had no choice, which was a 'crying shame.' Despite the 'dictation,' tenants would not complain, because they were only too glad to get a house.

The Chairman, Mr. A. W. Loveys (Taunton), said they had taken up the same question with other councils.

COMPANY NEWS

CORK GAS CONSUMERS' COMPANY

An interim dividend at the rate of 3% for the year ending December 31, 1953, has been declared by the Directors of the Cork Gas Consumers' Company.

BRITISH OXYGEN

The interim dividend in respect of the year to December 31, 1953, on the issued £8,117,698 ordinary stock of the British Oxygen Co., Ltd., is being maintained at the 6%, less tax, rate paid for the previous year. Last year's interim was followed by a final payment of 9% on the present amount of capital as increased by the rights issue of 1,873,315 £1 ordinary at 40s. per share in November, 1952. By reason of double taxation relief, the net United Kingdom rate of income tax payable by the company is estimated at 7s. 11d., and this is the rate to which any relief or repayment to a stockholder is limited.

WELLMAN SMITH OWEN

The group trading profit of the Wellman Smith Owen Engineering Corporation, Ltd., last year was £552,376, against £628,169 for the previous year. Net profit was £227,058 against £253,099, and the dividend has been raised from 15% to 17½%. Sir Samuel Roberts, in his annual review issued with the report and accounts, says that with a view to further expansion the corporation has acquired additional land at Kirkby, and development plans are under consideration. The volume of contracts in hand is the largest in the history of the corporation; about 29% of the total is for export. The engineering shops have been engaged to full capacity throughout the year, and the Darlaston works output, supplemented by the branch shops at Kirkby, showed a substantial increase on the previous year. Referring to furnace building and the contracting department, Sir Samuel declares that the volume of business actually completed during the period was lower than usual, partly owing to circumstances beyond the corporation's control. Important orders for steel works in this country have been obtained.

NICO LIGHT ENGINEERING

The accounts of the Nico Light Engineering Co.. Ltd., for the year ended March 31 show a profit after allowing for depreciation, taxation and all charges of £10,473, to which has to be added a balance brought forward from the previous year of £7,079, making £17,552. The directors recommend payment of a dividend of 10%, and a bonus of 10%, making 20%, less tax, absorbing £5,954, and leaving a balance to be carried forward of £11,598. The Chairman, Mr. R. E. Green, in his statement circulated with the accounts, says the trading profit shows a decrease of £8,162 as compared with the previous year. During the latter part of last year the company met with a gradual fall in metal prices and consequent slowing up of orders. The metal market is still very unsettled, and this is having the effect of making buyers shy to place large orders. Several new lines have been introduced and these are meeting with a good reception.

GEORGE COHEN SONS & CO.

Before taxation the profit of George Cohen, Sons & Co., Ltd., for the year ended March 31 was £1,764,760, against £1,825,769 for the previous year. Net profit, after taxation, was £451,728, against £704,018. A final dividend of 8½% will make a total of 12% for the year, leaving a balance to be carried forward in the accounts of the parent company of £79,030. Referring in his statement, circulated with the accounts, to the impending withdrawal of the excess profits levy and the partial restoration of initial allowances, Mr. C. M. Cohen, Chairman and Managing Director, says if industry is to compete successfully in world markets and play the major part in maintaining a desirable standard of life in these islands it must be permitted to retain earnings adequate for its modernisation and re-equipment. Only in this way can it respond effectively to the exhortations which are repeatedly made to it and which, under present circumstances, are as tedious as they are unrealistic.

Trade News

Dual Purpose Tractor

The spontaneous combustion of small coals is one of the hazards of keeping large coal stocks. By the exclusion of air the risk is substantially minimised, and a highly efficient method of consolidating the coal has been devised by the staff of British Electricity Authority's, Ferrybridge Power Station, Nr. Nottingley, in Yorkshire.

The bulldozer blade has been removed from their 95 H.P. Fowler 'Challenger 3' and a cast iron roller weighing 2 tons, constructed at the station, has been fitted to the standard bulldozer mounting frame. Two men can effect the change inside 15 min. Additional weight can be given to the rolling operation by setting the unit in the normal dozer 'dig' position, when a considerable part of the tractor's weight is exerted on the roller.

With the roller fitted, chief duty of the 'Challenger 3' is to compact a hard level surface on the 33,000 sq. yd. stack, to prevent air from entering and causing spontaneous combustion. It also serves to provide a temporary road, enabling wagons with 6-8 tons coal capacity to travel easily across the surface. The areas most particularly susceptible to spontaneous combustion are the sides of the stacks, exposed to the fanning effect of prevailing wind. These are regularly compacted, to prevent the ingress of air.

Regular temperature readings are taken at various points on the stack, and should the temperature exceed 120° F., the affected area is dozed out, spread, allowed to cool, and finally consolidated. —*John Fowler & Co. (Leeds), Ltd., Leeds, 10.*

Muir-Hill LH-1 Loader

Designed to offer the benefits of a mobile hydraulic bulk materials loader under the most confined working conditions, E. Boydell & Co., Ltd., have produced a machine weighing under 2 tons, yet capable of high rates of loading comparable with normal size mobile loaders. This is achieved by the extraordinary ease of control, general manœuvreability of the machine, and speed of operation, which combine to offset the smaller size of the machine.

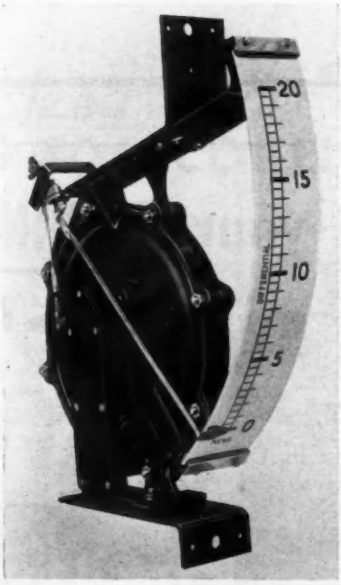
The overall dimensions of the LH-1 are such, however, that the prime function of the machine is immediately recognised in that it provides the answer to countless bulk handling problems in industry where limitations of space, and particularly headroom, have prevented any alternative to hand labour being employed. The Muir-Hill LH-1 loader requires a minimum of 6 ft. 6 in. headroom, has a wheelbase of 4 ft. ½ in., a track of 3 ft. 7 in. and a turning circle of 7 ft. 6 in. radius. These leading dimensions have the effect of enabling the machine to operate practically wherever a labourer can swing a shovel. On the other hand, the machine has a maximum under-bucket clearance of 6 ft. 6 in. which enables it to load into hoppers, bunkers, skips, and all but the largest road vehicles. The steering layout plays a considerable part in the machine's manœuvreability and employs divided track rods.

The LH-1 is powered as standard by a 3-cylinder diesel engine of 2.36 litres capacity, which develops 30 B.H.P. at 1,300 r.p.m. A 4-cylinder petrol engine is also available as an alternative. According to conditions and the material to be handled, three alternative sizes of bucket are available. Additional to the standard size of 10.5 cu.ft. capacity, a heavy duty bucket of 6.5 cu.ft. and a light materials bucket of 14.5 cu.ft. for coal and coke are supplied and the changing of buckets is readily effected. —*E. Boydell & Co., Ltd., Old Trafford, Manchester.*

Differential Draught Gauge

A recent development in the range of instruments manufactured by George Kent, Ltd., for assisting combustion control is the 'Differential Draught Gauge.' Of the many instruments used in the measurement of differential pressure it is the simplest, and therefore exceptionally useful on all boiler plants down to the smallest. The gauge is especially useful on those boilers fired with pulverised fuel, the load on the pulverising mill being indicated by the differential pressure across the mill.

The measuring element is a sturdy diaphragm-operated mechanism. The diaphragm divides two pressure-tight chambers, one receiving the upstream pressure and the other the downstream pressure. Two springs, one in either chamber, support this lambskin diaphragm. The spring in the upstream chamber ensures the correct direction of



movement of the diaphragm; and the other spring, the 'control spring,' is of calibrated strength and governs the range of the instrument. The movement of the diaphragm is transmitted to the light balanced pointer by means of a linkage system through a pressure-tight hat-leather-type gland. There is a zero-adjusting screw on the pointer arm. The pointed indicates on a bold vertical edgewise scale calibrated in differential-pressure units. When internal illumination is required a translucent scale is used. Consistent operation is ensured by the generous dimensions of the diaphragm, and an accuracy of ±2% of maximum differential head is guaranteed. The instrument is capable of measuring up to 30 in. W.G. differential head. A dust and fume proof case houses are differential unit. Ranges available are 0-2, 0-3, 0-4, 0-6, 0-9, 0-12, 0-16, 0-20, 0-25, 0-30 in. differential pressure— *George Kent, Ltd., Luton, Bedfordshire.*

6 Tons in 1 Min. 41 Sec.

A carefully timed test of the 'Kangaroo' loader, the latest product of Crone and Taylor, Ltd., has revealed a performance that excels anything which the makers have hitherto claimed. A lorry laden with 6 tons of loose shale and stones up to 6-in. size was backed up the ramp and driven off after discharging its load into the hopper in exactly 1 min. 41 sec. Within this remarkably short period every operation was carried out, including the unlocking of the lorry's rear door and re-locking by the 'Kangaroo's' attendant.

In view of this demonstration, it is considered that in normal practice 6-ton lorries can be discharged by the 'Kangaroo' in 2 min., which means that this machine, which combines ramp, conveyor, and hopper as a single unit, is capable of handling 180 tons per hour.—*Crone & Taylor, Ltd., Sutton Oak, St. Helens, Lancs.*

Margrave Service Filter

The Margrave service filter is designed for the easier maintenance of vacuum units used in service clearance. This device, when connected between the Vacuum plant and the service to be cleared, prevents all rust, scale, and other impurities from being drawn into the main tank; therefore cleaning is not required.

In many areas, it has been found that the periodic cleaning of the vacuum tank is an unpleasant and lengthy task, being often left until a considerable deposit has accumulated. The greater the deposit, the less is the effective capacity of the tank and the heavier the load for the van to carry. The use of the Margrave service filter in the vacuum line enables the deposit to be collected in the catch-pot and disposed of in less than 3 min., at convenient intervals.

The filter has been under test in one of the gas boards, and has been proved to be successful on both wet and dry services. During the tests, the filter was cleared daily to enable observations to be made on the amount of deposit obtained from services. In practice, the intervals at which it is to be cleared are best left to local decision, as the time required for this operation is negligible.

The Margrave service filter in no way alters or impedes the operation of any suction unit, but renders the maintenance of this unit an easy matter. It reduces wear on the vacuum plant and on the evacuating pump, as all particles are eliminated from the main tank. It obviates the necessity for opening and re-sealing of handholes on the main tank, which frequently occur in awkward positions. It enables the deposit from any particular service to be examined while still connected. It can be left on the van, or is easily lifted off by the two carrying handles. If it is then placed at the connection to the service, it can be employed as a guide to the effectiveness of the suction since the particles can be heard falling.—*Margrave Manufacturing Co., Ltd., 7, Margravine Road, London, W.6.*

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117/65

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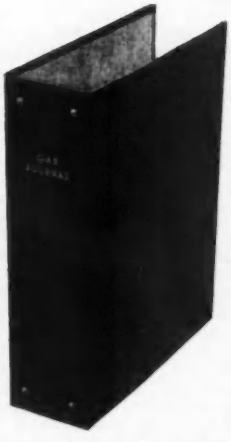

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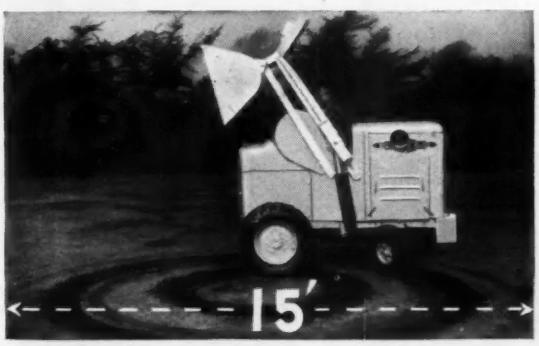
* *Claustrophobia: Abnormal fear of being in a confined space.*

This pocket-sized loader is MADE FOR CONFINED SPACES

No need for modern open layout in your works before you can have the benefit of this latest form of mechanisation. This Boydell-built Hydraulic Loader with its 15 ft. turning circle and its ability to get and dump all classes of loose loads whilst under a 6 ft. 6 ins. ceiling brings real power loading to bear in your tightest corners. Write to us today for the LH-1 brochure which deals fully with this machine and its capabilities.



A 15 ft. turning circle looks very small and is very small!

Muir-Hill LH-1 HYDRAULIC LOADER

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A battery of three 8ft. diameter Wellman-Galusha Gas Producers, equipped with fuel storage bins and Gas Cleaning Plant, for the efficient gasification of anthracite, coke or coke breeze.

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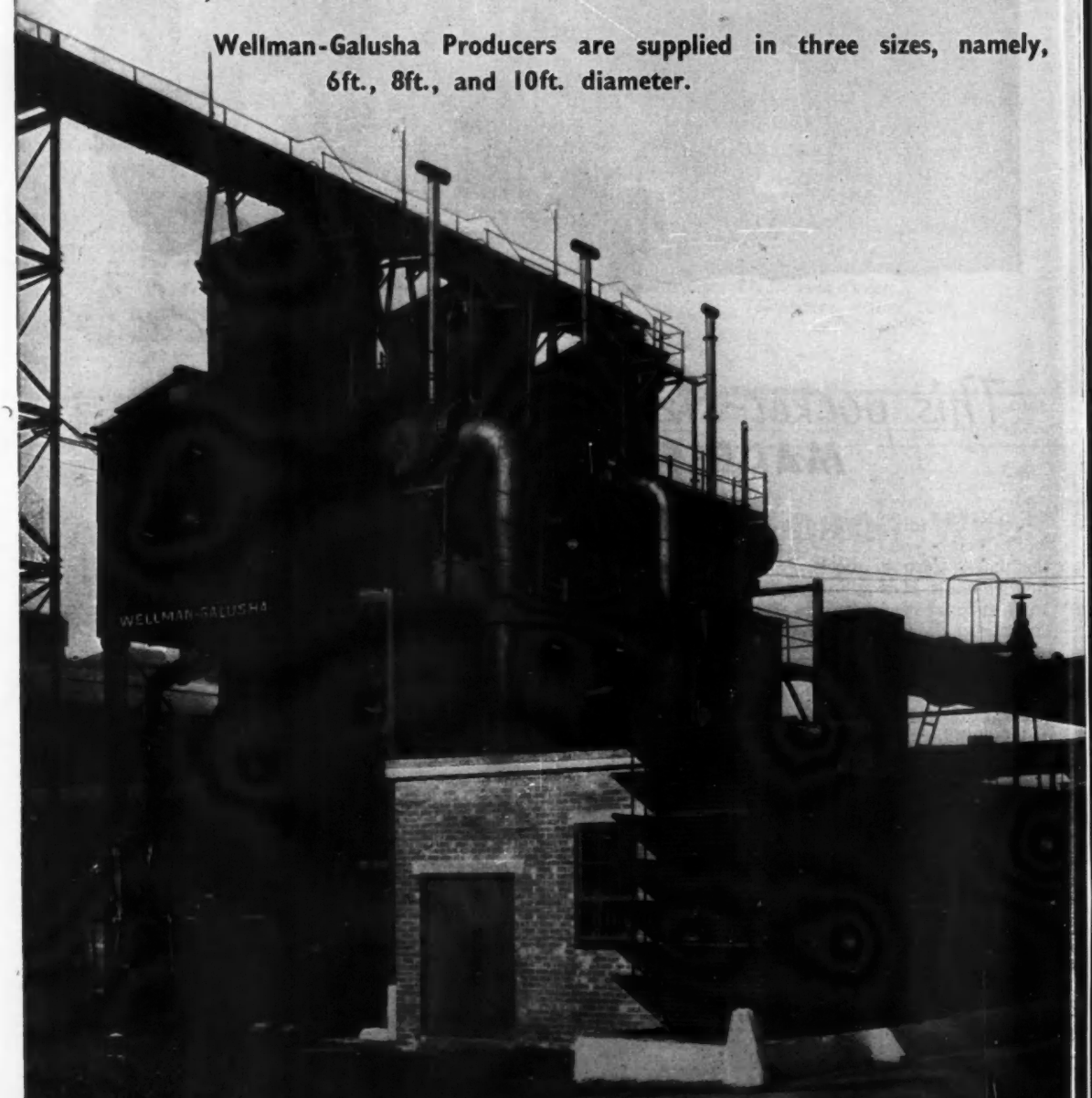

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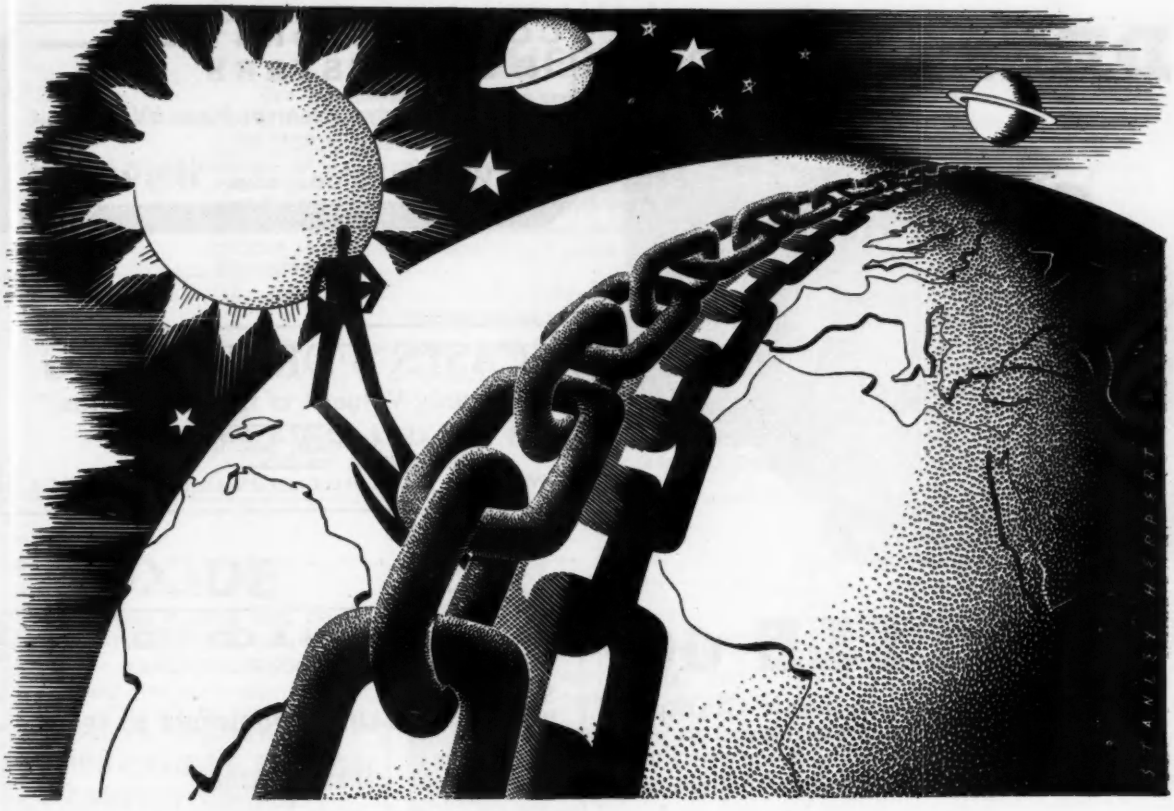

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The business founded by Thos. W. Ward in 1878 has grown from the smallest of small beginnings into a major commercial organisation with links throughout the entire industrial world.

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STYLE 60

Adjustable Leak Clamps

ANNOUNCEMENT The name "Dresser" will need no introduction to Gas and Water Undertakings as Dresser Manufacturing Division of Bradford, Pennsylvania, U.S.A. have since 1870 been the pioneers and leaders in design and manufacture of joints and other devices for the repair and maintenance of gas and water mains.

The Style 60 Adjustable Leak Clamp has been distributed in the United Kingdom for the past 30 years by Hewitt Construction Limited, which company is now in Voluntary Liquidation.

The managerial, sales and other staff of Hewitt Construction Limited will act in similar capacities with Dresser Manufactures (England) Limited.

As a result of operating in our own name in this country and with the closest co-operation of research, technical and other departments of the parent concern in the United States we hope to render valuable service to all Gas and Water Undertakings.

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SPENT OXIDE

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BIDEFORD AVENUE,
PERIVALE, GREENFORD.

Telephone: Perivale 3238. Telegrams: Gasfret, Greenford, Middlesex.

PUBLISHERS' NOTICE

The " Gas Journal " is published every Wednesday, price 1/3d.; by post 1/5d.

Subscription Rates: Home and Empire:—52/- per annum; Foreign:—60/- per annum. (Both payable in advance.) A copy of the " Gas Journal " Calendar & Directory is presented each year to continuous subscribers.

Classified Advertisements: All small classified advertisements are charged at 1/9 per line (approx. 7 words)—minimum charge 10/6. A Box Number address occupies 2 lines, and a further 6d. is charged towards cost of postage on replies. Copy must be received by first post on Monday to ensure insertion in that week's Journal.

Displayed Advertisements: Rates obtainable on application to the Business Manager. Change of copy for displayed spaces must be received 14 days prior to publication if proofs are required. Type area of inside pages 10" deep × 7" wide; block screen 120.

BUSINESS MANAGER: S. T. CULLEN

MIDLANDS OFFICE: 10, Union Street, Birmingham.

NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. *'Phone:* Harrogate 84291.

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Highest prices paid for Spent Oxide.

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PALMERSTON HOUSE, OLD BROAD STREET, LONDON, E.C.2.

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APPOINTMENTS VACANT

The engagement of persons answering these advertisements must be made through a Local Office of the Ministry of Labour or a Scheduled Employment Agency if the applicant is a man aged 18–64 inclusive or a woman aged 18–59 inclusive unless he or she, or the employment, is excepted from the provisions of the Notification of Vacancies Order, 1952.

DRAUGHTSMAN (SENIOR) age 30/40, for large constructional engineering Co in the Midlands. Wide gas holder and platework experience essential. Good opening for right man. Pension scheme. Write in confidence stating age, experience, and qualifications and salary expected to : Director & Secretary, Box No. 256, 19/21 Corporation Street, Birmingham, 2.

WALES GAS BOARD

APPOINTMENT OF ACCOUNTANT
SWANSEA GAS UNDERTAKING,
GROUP ACCOUNTANT,
SWANSEA GROUP

APPLICATIONS are invited from qualified persons or persons with experience of public utility accountancy work for the above appointment, for which the salary offered is £950 0s. 0d. per annum. Experience of accountancy in the Gas Industry will be an advantage.

The person appointed will be attached to the Swansea Gas Undertaking and will be responsible for the whole of the accountancy work throughout the Group. The successful candidate will be required to pass a medical examination, and subject to any protected superannuation rights will be required to subscribe to the Board's Superannuation Scheme.

Applications furnishing personal details and particulars of experience and qualifications, with the names of two referees, should be sent to the undersigned to arrive not later than October 3, 1953.

C. B. MAWER,
Secretary.

2, Windsor Place,
Cardiff.

PLANT OPERATORS. Seniors and Juniors required, experienced in starting to work and servicing of Gasworks Carbonising Plants, Horizontals, Intermittent Vertical Chambers, etc. Good opportunities for experienced men. Pension scheme, profit-sharing, and opportunity for travel both in this country and abroad. Good salaries to the right men. Apply giving full details of previous experience, age and salary expected to : W. J. Jenkins & Co., Ltd., Beehive Works, Retford, Notts.

NATIONAL COAL BOARD invite applications for the superannuable appointment of a TECHNICAL OFFICER in their Headquarters Carbonisation Department in London. Applicants should hold recognised qualifications in fuel technology or chemical engineering and have had practical experience, preferably in some branch of the fuel industry.

Duties will be concerned with technical developments in carbonisation and allied fields and problems concerning the quality of coke and carbonised fuels.

Salary according to qualifications and experience will be within the range £900 to £1,300 per annum, inclusive.

Write, giving full particulars (in chronological order) of age, education, qualifications and experience (with dates) to National Coal Board, Establishments (Personnel), Hobart House, Grosvenor Place, London, S.W.1., marking envelope TT/685. Closing date October 29, 1953. Original Testimonials should *not* be forwarded.

THE SAN PAULO GAS COMPANY, LIMITED (total installed capacity 5,800 million cubic feet per annum), a British Company in Brazil, invite applications from suitable qualified GAS ENGINEERS aged 35 to 40 for the post in Sao Paulo of Assistant to Superintendent of Manufacture. Candidates should be experienced in gas manufacture and works maintenance and administration, with horizontal retorts, C.W. gas and ancillary plant. They should preferably hold the Higher Grade Certificate of The Institution of Gas Engineers in Gas Engineering (Manufacture). Salary will be in accordance with qualifications and experience taking into consideration cost of living ; three years' agreement subject to renewal with first class passage both ways ; four months' paid leave after three years' service ; superannuation scheme. Written applications, which will be treated in strict confidence, should be made to Mr. W. P. Kellett, Joint Manager, Canadian-Brazilian Services Limited, 148, Leadenhall Street, London, E.C.3. Applications should be received by October 12, 1953.

NORTHERN GAS BOARD

DARLINGTON DIVISION
MAINS AND SERVICE FOREMAN

APPLICATIONS are invited from suitably qualified persons for the above position in the Darlington Unit.

Applicants must be experienced in the control of men, supervision of the laying and maintenance of low and high pressure mains up to 30 in. diameter, and of services. Should be qualified to drive a motor vehicle.

Salary in accordance with Intermediate Grade VII Conditions I, Provincial 'A' (£470 to £515 per annum).

The successful applicant will be required to pass a medical examination.

Applications, stating age, qualifications and experience together with the names of two referees, should be addressed to Charles Hindle, Esq., Engineer & Manager, Northern Gas Board, Darlington Unit, Gas Offices, John Street, Darlington, not later than September 30, 1953.

F. WILSON,
Divisional General Manager.

(Classified advertisements continued on page 798)

APPOINTMENTS VACANT (ctd.)

EASTERN GAS BOARD

TWO First-Class District GAS FITTERS urgently required. Full J.I.C. Rates of Pay (Provincial 'A') and Conditions of Service. Newly built housing accommodation will be made available at appropriate weekly rentals. Applications stating age and giving full details of qualifications and experience should be forwarded without delay and addressed to the Group Manager, Eastern Gas Board, Gas Offices, Chelmsford, Essex.

EAST MIDLANDS GAS BOARD

ROTHWELL, near Kettering. Vacancy for FIRST CLASS GASFITTER at the Rothwell Undertaking: J.I.C. conditions and rates of pay (Provincial 'B' rating).

Service occupancy of good housing accommodation, adjacent to undertaking's showroom, is available on reasonable terms, and mutually satisfactory arrangements can be made for the wife of the person appointed to undertake part-time duties in the showroom at the appropriate salary.

Applications stating age, experience, qualifications and name of referee to the Group Manager, 40 High St., Kettering, to be received not later than Wednesday, September 30, 1953.

EAST MIDLANDS GAS BOARD

NOTTS & DERBY DIVISION

DERBY UNDERTAKING

HOME SERVICE SECTION

APPLICATIONS are invited from suitably qualified persons for three appointments in the above Section of the Derby Undertaking:—

SENIOR HOME SERVICE ADVISER

Candidates must hold a recognised diploma in, and have practical experience of, cookery and domestic science, and be capable of demonstrating and promoting the use of gas appliances, and in advising consumers on kitchen and other domestic problems involving the use of gas.

The salary will be within Grade A.P.T. VII (female) of the National Salary Scales (£436/500 per annum), according to qualifications and experience.

The successful applicant will be responsible to the Departmental Head for the organisation of this Section.

HOME SERVICE ADVISER

Candidates must hold a recognised Certificate in plain cookery and/or domestic science, and be capable of promoting the use of gas appliances and in advising consumers on kitchen and other domestic problems involving the use of gas.

Salary will be within Grade A.P.T. II/V (female) of the National Salary Scales (£244/432 per annum), according to qualifications and experience.

HOME SERVICE ADVISER TRAINEE

Candidates for the position of Home Service Adviser Trainee must have had Secondary School education and hold the General Certificate of Education, with a pass in Mathematics and English Language. They must be interested in domestic science and cookery, and be prepared to take an extensive course of training as laid down by the Board, which will involve attendance at evening classes. The salary will be within Grade A.P.T. I (£132/188 per annum) according to age.

Successful candidates may be required to pass a medical examination, and unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications, stating age, qualification and experience and giving full particulars of training, together with the names of two referees, should be addressed to:—A. Facer, Manager, Derby Sub-Division, Friar Gate, Derby, not later than ten days after the appearance of this advertisement.

EAST MIDLANDS GAS BOARD

APPOINTMENT OF MEDICAL OFFICER

APPLICATIONS are invited from suitably qualified persons for the position of whole-time MEDICAL OFFICER to the Board.

The person appointed will be in charge of the Board's medical services throughout the Area and, as part of his normal duties, will be required to advise the Board on the further development of their medical services.

Applicants should possess a higher professional qualification and have experience of an industrial medical service. A brief outline of the duties and scope of the post may be obtained on application to the undersigned.

The commencing salary will be not less than £2,000 per annum.

The successful candidate may be required to pass a medical examination and, unless already subject to a pension scheme by virtue of the Gas (Pension Rights) Regulations, 1950, will be required, if eligible, to join the Board's Staff Pension Scheme within six months from taking up the appointment.

Applications stating full details of age, education, qualifications and experience, together with the names of three referees, should be addressed to the undersigned to be received not later than Friday, October 23, 1953.

A. GWYNNE DAVIES,
Secretary.

Beverley House,
University Road,
Leicester.

LISBURN URBAN DISTRICT COUNCIL

GAS DEPARTMENT

APPLICATIONS are invited for the position of General Foreman.

Applicants should have previous experience in the operation and control of horizontal retorts and C.W.G. plant and be able to supervise the repairs and maintenance of all gas works plant and machinery. A new Council house will be available at a rent to be fixed.

Full details of training and experience to be sent to the undersigned.

G. A. MCNEICE,
Engineer and Manager.

Gas Works,
Lisburn,
Northern Ireland.
September 14, 1953.

WEST MIDLANDS GAS BOARD

WORCESTERSHIRE-HEREFORDSHIRE DIVISION

GROUP ACCOUNTANT—REDDITCH

APPLICATIONS are invited from suitably qualified persons for the above position. The successful candidate will be responsible for the accountancy of the Group and the preparation of financial and costing statements. Experience in a public utility undertaking will be advantageous.

The salary will be in accordance with Grade X (£665-£765 per annum) of the National Salary Scales for Gas Staffs.

The post is pensionable and the successful candidate may be required to pass a medical examination.

Applications, stating age, qualifications and experience, details of present and previous employment, together with the names of two referees, should be addressed to Mr. C. F. W. Rendle, Divisional General Manager, West Midlands Gas Board, Worcestershire-Herefordshire Division, 12, St. Nicholas Street, Worcester, to reach him within fifteen days of the appearance of this advertisement.

F. H. CURETON,
Secretary to the Board.

MAIN WATER HEATERS LTD., require the services of a competent TECHNICIAN to assist in their Development Section. Applicant should have good academic qualifications with a sound knowledge of heat transfer and ventilation problems. Apply:—Gothic Works, Croydon.

THE UNIVERSITY OF LEEDS

DEPARTMENT OF COAL GAS AND FUEL INDUSTRIES

GAS ENGINEERING AND FUEL TECHNOLOGY

THE COUNCIL will shortly make two appoint-ments in (*a*) Gas Engineering and (*b*) Fuel Technology. One or other of the appointments will be made to a lectureship and one to an assistant lectureship. Candidates for a lectureship should be well qualified in pure or applied science, with experience in the gas or other branches of the fuel industries; knowledge of oil technology would be an added advantage. Candidates for an assistant lectureship should be well qualified in pure or applied science and preferably should have had some industrial experience. Salary on appointment will be according to qualifications and experience on the scale £500 × £25—£550 a year for an assistant lecturer, £550 × £50—£1,100 for a lecturer.

Applications (three *copies*) stating age, qualifications and experience, together with the names of three referees, should reach the Registrar, The University, Leeds, 2 (from whom further particulars may be obtained) not later than November 2, 1953.

FOR SALE

FOR SALE:—Two second-hand C.3 Vesta Gas-Fired Boilers (cast iron type) 1,200,000 B.T.U.s per hour each, in excellent condition. Write: No. 167, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

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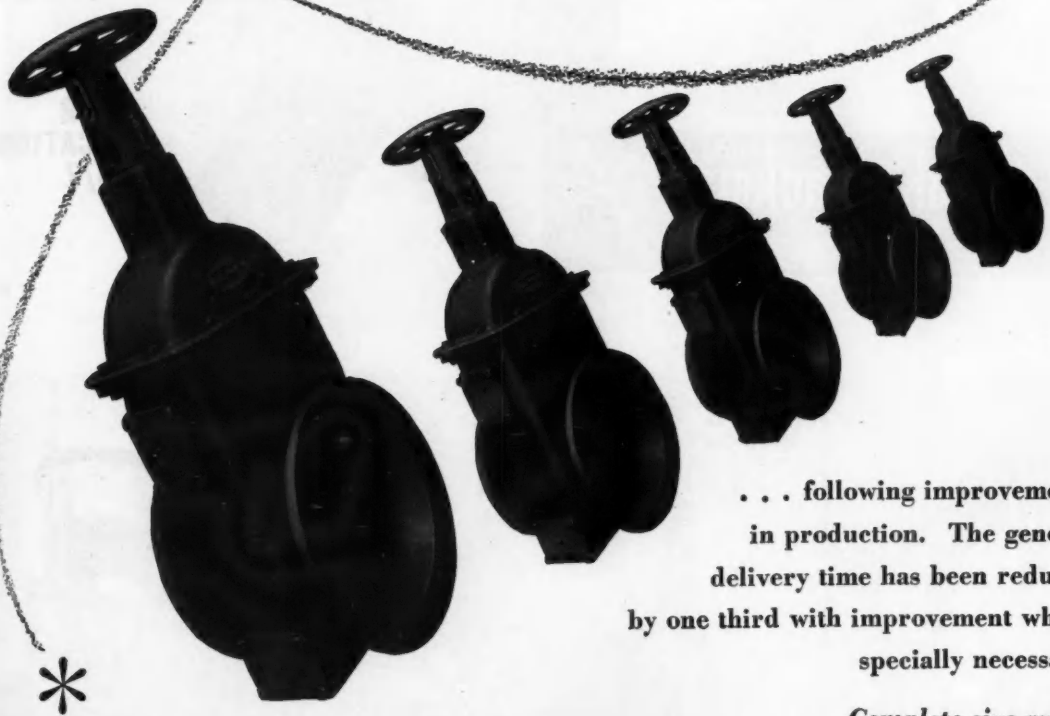

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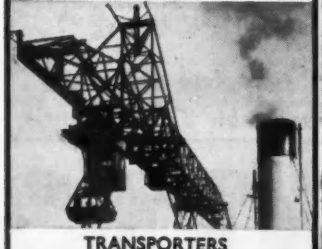

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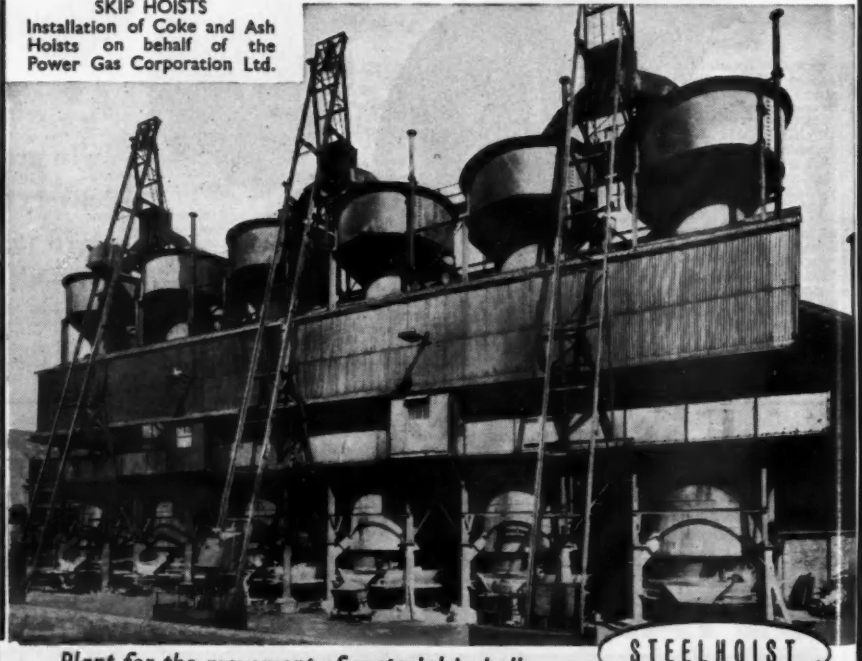

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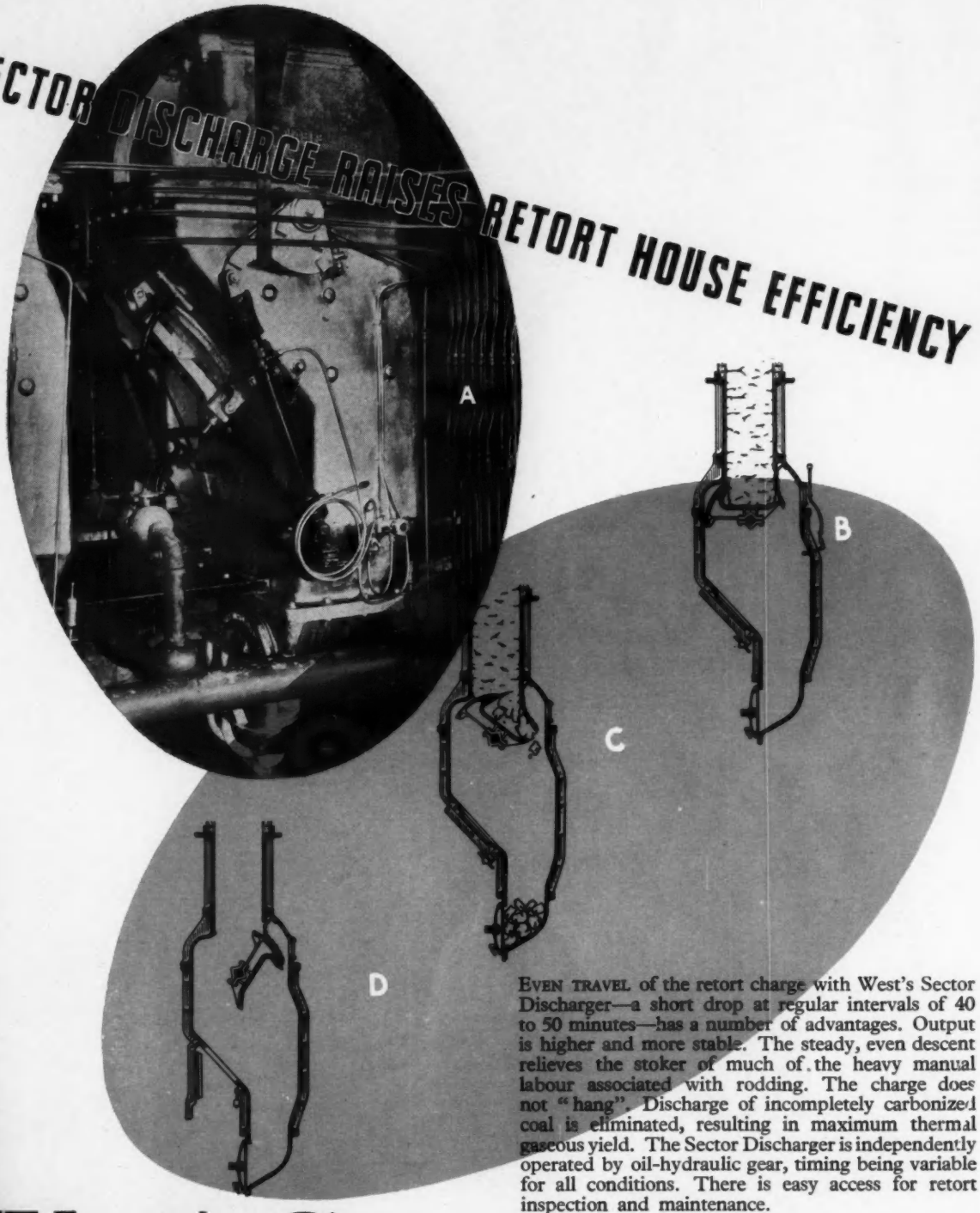
SECTOR DISCHARGE RAISES RETORT HOUSE EFFICIENCY



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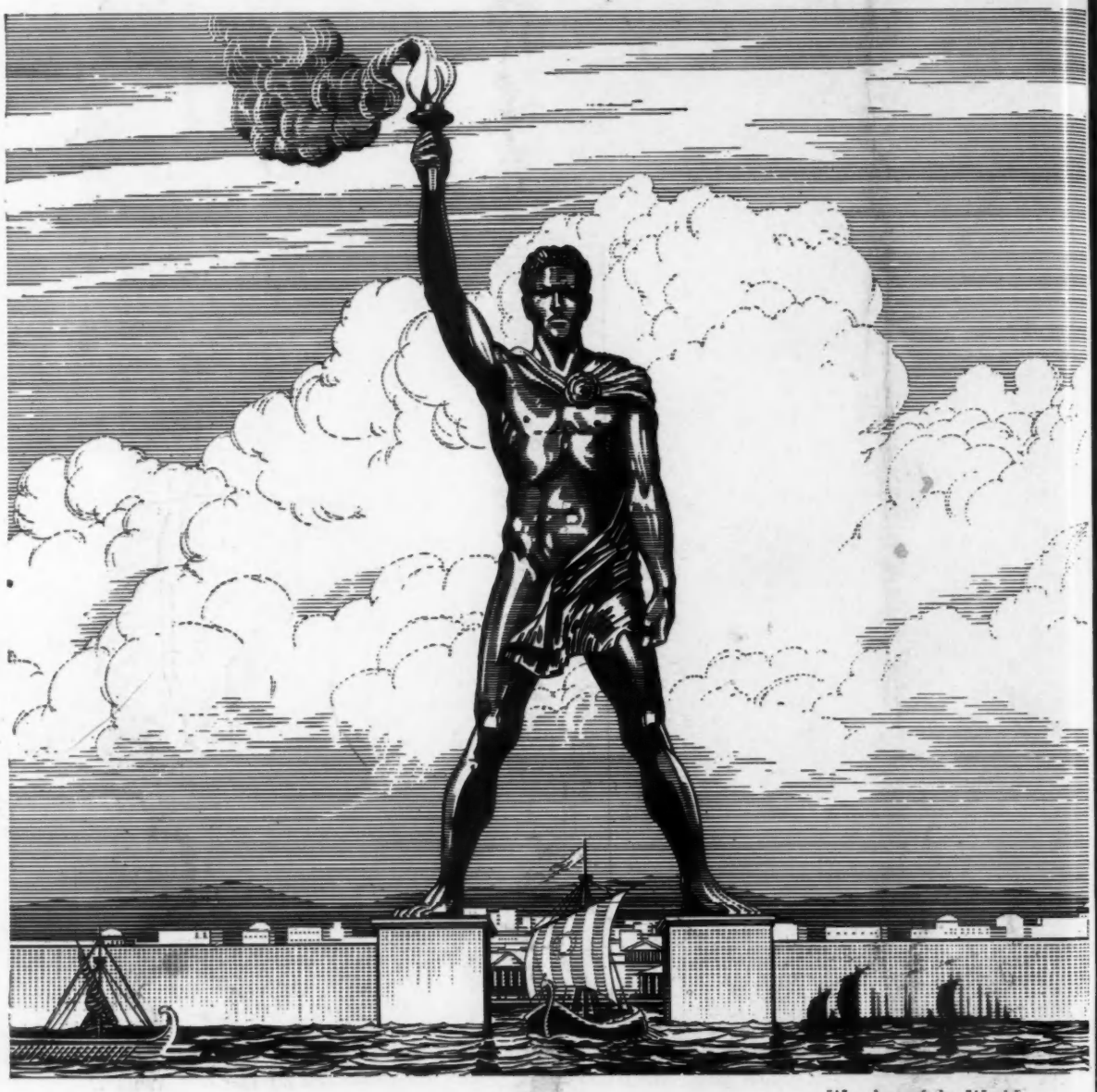

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